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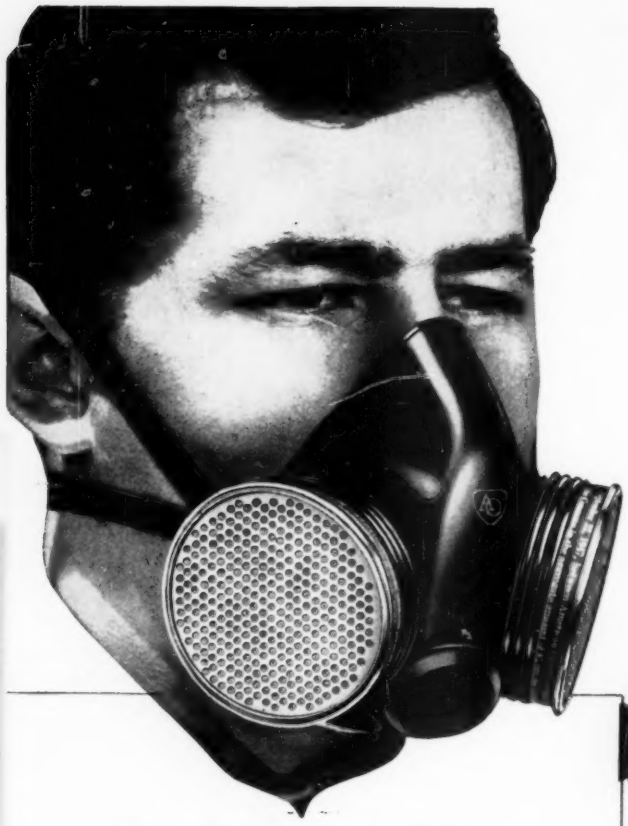

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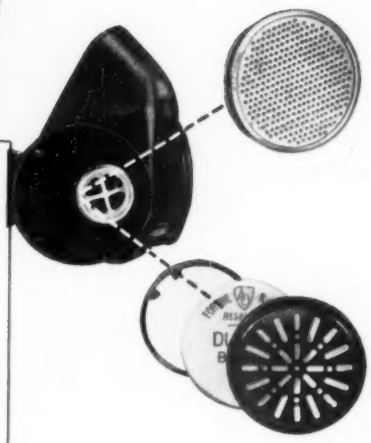

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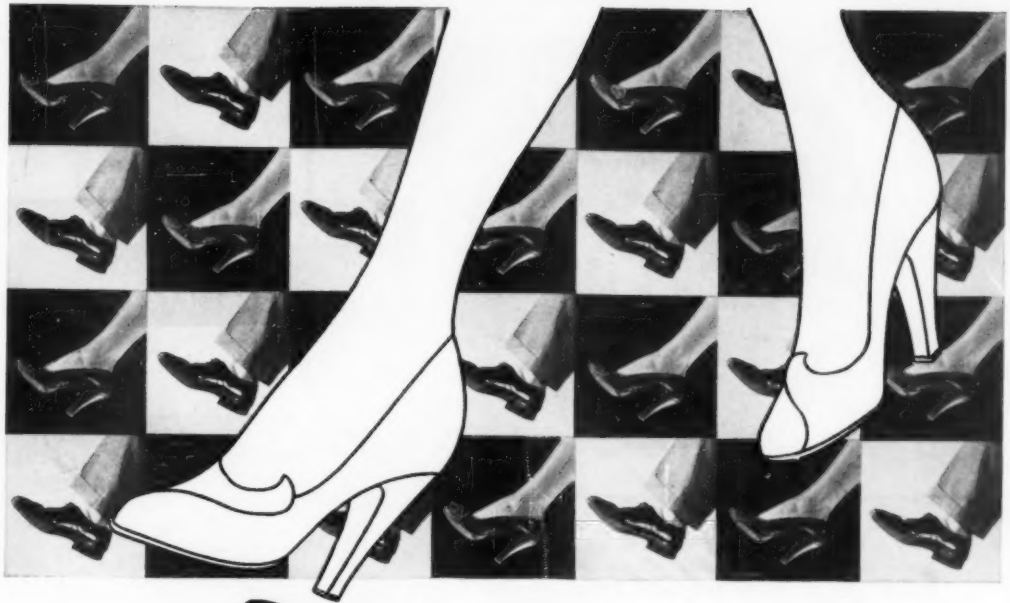

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NOTICE
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LOAFING ALLOWED
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BE CAREFUL
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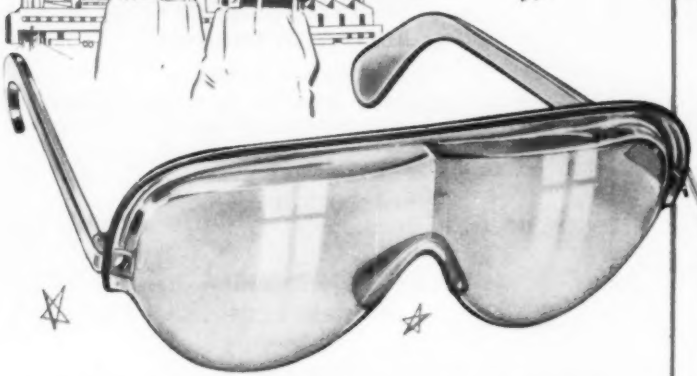

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FORMERLY "SAFETY ENGINEERING"

The Magazine of Safety

A MONTHLY PUBLICATION DEDICATED TO ACCIDENT PREVENTION, MAINTENANCE, HEALTH CONSERVATION AND FIRE CONTROL FOR EFFICIENT PRODUCTION.
EST. 1901

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It's Safe to Say

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★ THE IRONIC CONTRAST

The holiday season has a tempo all its own and has always brought with it a welcome lightness of heart and a greater urge to be of good will. Most of us, as the last days of December approach, will find that the poor old earth is a little more cheerful place than we sometimes think. It is true that today's tinsel and trimmings are a far cry from the holly and mistletoe of Dickens' time. But if sleighbells have become a rarity, the sidewalk Santas' bells ring out just as loudly and just as spiritedly. If nerves get slightly frayed during the hubbub of Christmas shopping, we can more quickly ignore the trodden toe and the elbow in ribs.

In spite of the changes that have been wrought in our manner of celebrating Christmas, the infectious spirit of the day is apparently indestructible. For this reason, it is all the more sobering to know that some individuals will not be able to enter into the joyousness of the occasion. The simple truth of the matter is that men themselves are still destructible and that accidents are no respecters of seasons or holidays. There will be accidental deaths in factories, on the highways, in the homes—even as a result of the careless use of Christmas trees.

The holiday season also happens to be a time of reckoning, for one year is coming to an end and another is about to begin. In terms of safety, this is the period of the year when the statistical books on accidents are closed and the grim count brought to its final total. This is the time when one must look back and see how many eyes, hands and feet have been lost, how many bones broken, how many working days stolen, and how much money wasted because of unsafe conditions, poor maintenance, the inattentiveness of employees, the lack of proper protective equipment or ignorance of how to use it.

With the day of judgment for our year's mistakes nearly here, there are still a few weeks left in which to keep accident rates as low as possible. Because December comes at the end of the annual period and everyone's mind is distracted somewhat by the coming holiday pleasantries, there is a tendency for all of us to be less alert to our immediate jobs. Unfortunately, it is just at such times when we are less attentive that accidents have an opportunity to strike.

Safety programs, therefore, should be pursued with the utmost vigor at this time of the year. A little prodding to keep everyone reminded that accidents too are in season will make Christmas and New Years a time of rejoicing for more than just the favored many. Otherwise, an unfavored few, accident victims and their families, will taste tears made more bitter than usual by the ironic juxtaposition of their personal tragedies with the general gayety of the holiday season.

In this special sense, then, we wish to one and all a truly Merry Christmas and a Safe and Happy New Year.

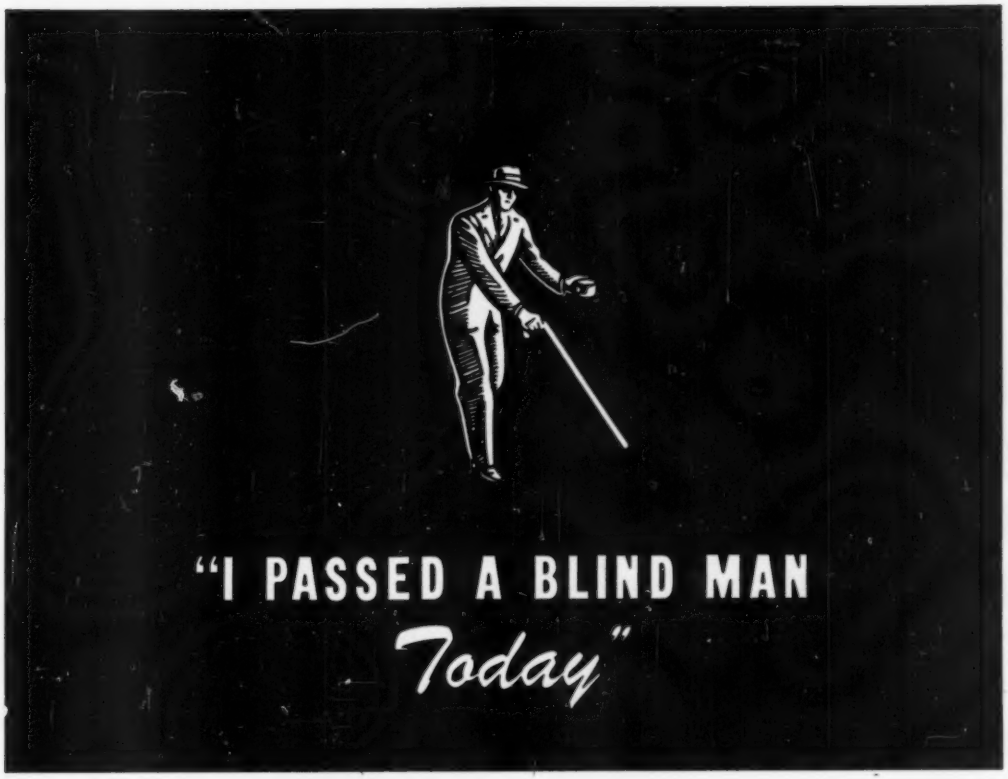
★ THE FIRST OF THE YEAR

The first 1952 conference of interest to readers of this publication will be the Plant Maintenance Show in Philadelphia on January 14–17. It is a first, not only chronologically, but also in the sense that it is the biggest maintenance exposition in the country.

This is the third of the annual Maintenance Shows, the first two having been held in Cleveland with enormous success. As in the past, representatives will be coming from all parts of this country and Canada. With Philadelphia as the site, the 1952 meeting should be of particular interest to the heavily industrialized eastern states, and, in fact, the show is being held in the mammoth Convention Hall in order to accommodate the expected throngs.

Every factory, machine shop, store and office building has the problem of keeping its structures and working areas in good condition. The Plant Maintenance Show offers those responsible for maintenance and production an opportunity to hear prominent authorities discuss specialized as well as general aspects of building, machine and electrical up-keep. Needless to say, these subjects are of vital interest to the safety field. There will also be a large and comprehensive display of maintenance products and services by manufacturers of such equipment. We suggest that you not only circle the dates of January 14–17 on your calendar but also make arrangements now to attend the show.

R.P.E.



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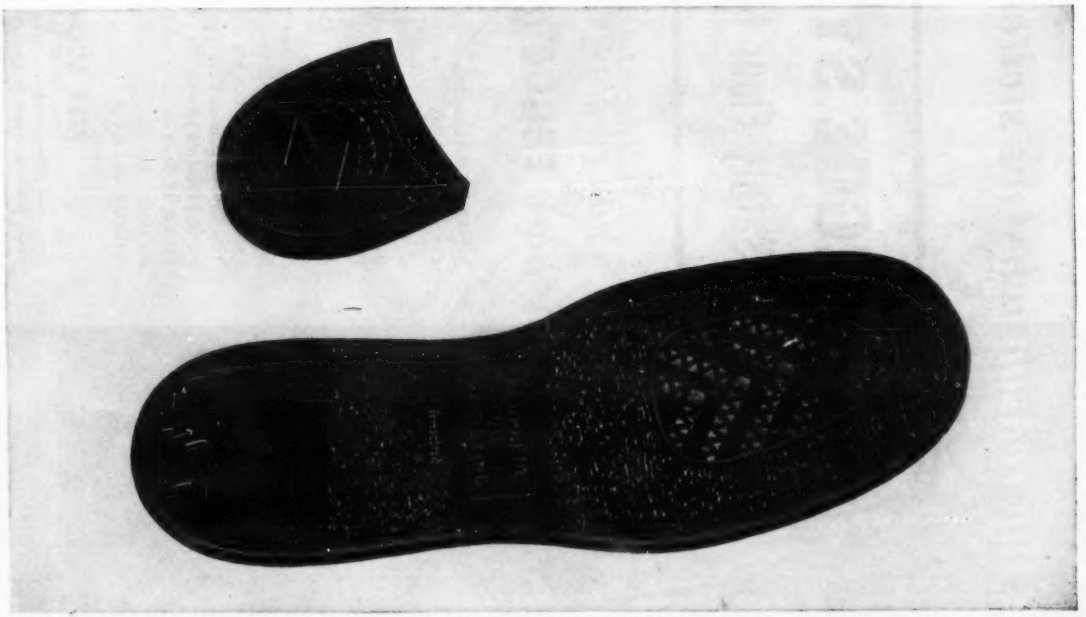

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SAFETY MAINTENANCE & PRODUCTION
VOL. 102, No. 6 • DECEMBER, 1951

INDUSTRIAL DEFENSE

By HORATIO BOND, Chief Engineer
National Fire Protection Association
Boston, Massachusetts

What can American industry do now to have its fire defenses ready for any possible national emergency?

IT WOULD be very nice if we knew when and where and by what weapons our industrial plants might be attacked in a future war. If anyone knew these things it would make the problem a lot easier and much more satisfactory from the standpoint of getting an intelligent solution.

It is probably fair to assume that attacks with high explosives and incendiaries are not likely on targets in the territorial United States until an enemy has bases a lot closer than any we have heard of so far. This leaves us the A-bomb as the weapon likely to be used by an enemy. In fact, there is official sanction for the idea of developing civil defense plans on the basis that an enemy might attack us with A-bombs of the sort dropped by the U. S. Air Forces on Hiroshima.

We also have to put ourselves in the position of an enemy and try to figure out what would do him the most good, assuming that he could hit us with an A-bomb attack. It would hardly be worth attempting unless, by such an attack, he could seriously harm us. This is perhaps the most hopeful part of the whole picture, because war is much more likely to be delayed by an enemy's inability to hit us hard enough than by any other considerations which might enter the enemy's mind.

The kind of attack that makes the most sense from the enemy's point of view is a one-shot surprise attack in an attempt to knock out our principal centers of production. The business of putting a bomb of any type on a target (To page 41)

DRY CHEMICAL'S GROWN

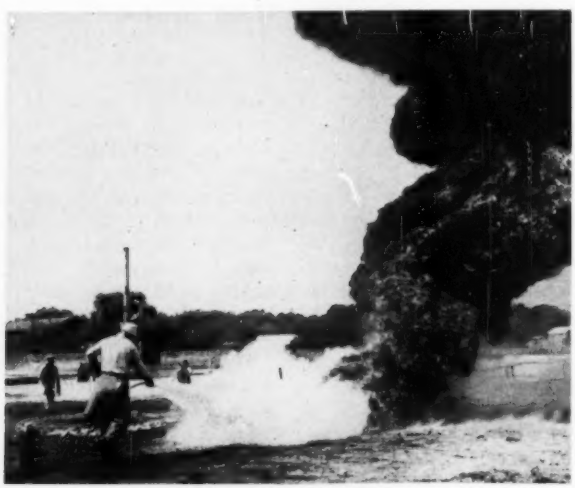
Continued improvements in the methods of applying dry chemical have brought this fire extinguishing agent deserved recognition as a necessary tool for industrial fire protection.

MODERN methods of fire-fighting have come a long way since the early days of the bucket brigade. Scientific studies of fire by experts in the field have shown us conclusively that all fires are not alike—nor are the extinguishers used to combat them.

Running a close second to the need for adequate fire protection in industry is the need for more widespread knowledge of how to choose the right type of extinguisher for the "risk area" involved.

Comparatively young in the field of fire safety, but nevertheless an invaluable aid to American industry, is the dry chemical fire extinguisher. It was offered to the public back in the 1920's, in the form of a small package whose contents were guaranteed to extinguish a blaze with amazing speed. As it turned out, advertising claims were close to the truth since these "extinguishers" were filled with sodium bicarbonate.

The extinguishing action of sodium bicarbonate is unique. Fires may be extinguished by cooling the burning material to a temperature below which it will not burn (as with water streams), by separating the burning material from the flame so as to remove the fuel (as in turning out a gas burner), and by separating the oxygen in the air from the fuel (as is done by the blanket of foam over gasoline or by a layer of carbon dioxide or other inert gas.) When inert gases such as carbon dioxide are used, it is called "smothering a fire." If the carbon dioxide is poured over a fire, a lot of gas is lost and accordingly a considerable quantity of carbon dioxide is generally necessary to extinguish a fire. However, with dry chemical the separation of oxygen in the air from the fuel is achieved in an unusual manner. Sodium bicarbonate decomposes under heat to form carbon dioxide and water vapor (steam). The carbon dioxide and steam are formed right at or in the flame of the fire and produce a thin but effective barrier which prevents continued burning of the fuel. This, accordingly, requires only a relatively small quantity of carbon dioxide and water vapors to produce extinguishment.



30-lb. dry chemical fire extinguisher goes into action against a liquid propane fire.

Molecular Action

Sodium bicarbonate does not break down at normal temperatures to produce the carbon dioxide and water vapor. It is only after the dry chemical has been raised to over the boiling point of water that the evolution of these inert fire smothering gases is perceptible. At flame temperatures, the particles of dry chemical decompose almost instantly to form these gases. The action may be termed "a molecular explosion" which may be compared

UP

By P. C. HENSLER
Fire Protection Institute
New York, N. Y.

Vertical jet of liquid propane, escaping from a one-inch open pipe under pressure of 75 lbs. per square inch, is extinguished with two 350-lb. wheeled extinguishers in 7.4 seconds during dry chemical test.

with an atomic explosion. When atoms explode, they split into other materials some of which are new atoms. The explosion of the atom releases heat and causes fires. The explosion of the molecule of sodium bicarbonate in dry chemical results in the formation of new molecules (carbon dioxide, water and soda ash). Before the molecule of sodium bicarbonate can "explode" it must absorb heat rapidly and the resulting materials extinguish fires.

When the fuel combines with the oxygen atoms, heat is released and the electrons "vibrate" giving off visible light and heat. If a molecule of carbon dioxide separates the molecule of fuel from the oxygen, there will be no combination, no heat given off, and no flame. Accordingly, when dry chemical strikes flame, the flame "goes out like a light."

All too often, however, the unknowing buyer of the Twenties found his fire-fighting weapon less than adequate in time of emergency since changes in weather hardened the contents rendering them useless. Even when climatic conditions were in his favor and the extinguishing agent remained in powdered form, its effect on the fire depended largely upon the user's aim and just how close he was able to get to the flames.

The fire protection industry at that time was fully aware of the value of sodium bicarbonate in controlling certain types of fire. But before the industry stamp of approval could be placed on this method of extinguishment, much had to be done to overcome certain stumbling blocks in its use and care.

Improvements

The industry immediately set about to overcome these obstacles and when the dry chemical unit was submitted to the Underwriters' Laboratories for testing, the following improvements had been made:

1. The sodium bicarbonate had been reduced to a fine powder to eliminate caking in the extinguisher
2. Pressure in the form of carbon dioxide gas had been added enabling the user to fight the flames without danger to his person.
3. Nozzles had been devised to permit the fire-fighter to control the stream and direct it at the trouble spot

In 1930 the dry chemical unit passed the rigid performance tests of Underwriters' Laboratories for reliable fire protection against flammable liquid or electrical fires, indoors or out, at all times of the year. The extinguishers are non-toxic, non-corrosive, non-conductors of electricity and non-freezing at any climatic temperature.

The composition and fineness of the dry chemical charges may vary with the manufacturer but the materials added to the original sodium bicarbonate make it free flowing. To control the span of the dry

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FEATURE

This is the fourth of a series of five major articles on Fire Prevention. The fifth article of the series will appear in the January issue of SAFETY MAINTENANCE & PRODUCTION.

chemical, carbon dioxide has been harnessed as an expelling power. Again, methods of releasing carbon dioxide to provide the essential pressure vary with the manufacturer. Several types of nozzles now in use offer diversified fire-fighting ability. One nozzle discharges the agent in a wide, fan-shaped arc at low velocity to allow maximum coverage in squelching fires involving spilled gasoline. Another provides a long, straight stream for fighting overhead fires or fires in electrical equipment.

Care and Use of Extinguishers

Dry chemical extinguishers are suitable for use on flammable liquid fires and fires in electrical equipment (the dry chemical has an electrical conductivity about equivalent to that of air). Since dry chemical not only reduces flames to a smoldering state, but also "inerts" surrounding material with a fine chemical coating, it is recommended by the Factory Mutual Laboratories for quick stopping of flash fires in textile lints. When put to this use, however, a small hose or water spray should be provided to complete extinguishment of the smoldering blaze.

It is impossible to conserve the carbon dioxide in the extinguisher if the entire contents are not used. Therefore, the used cartridge should be replaced by a full one to be ready for use when needed.

The carbon dioxide cartridge should be weighed with accurate scales at least once a year to determine whether there has been a loss of weight in excess of the amount specified on the extinguisher nameplate. In all cases, only dry chemical and cartridges furnished by the manufacturer should be used. Spare recharging materials should be kept on hand.

Wheeled Units

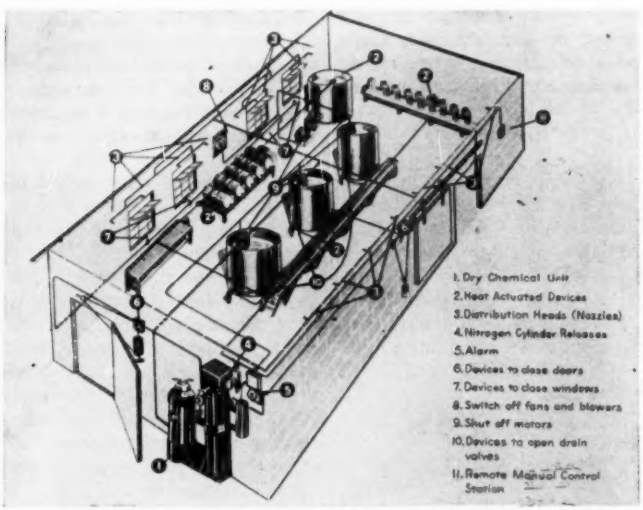
Wheeled type units are available in practically all types of extinguishers. Dry chemical wheeled extinguishers are generally supplied in 140 and 300 pound capacities. The pressure used to expel the contents is obtained from nitrogen cylinders. The nitrogen passes through set and sealed reducing valves so that the pressure does not exceed 230 psi. These wheeled units are equipped with nozzles which allow the operator to discharge either a relatively low velocity stream with a wide fan-shape or a cone-shaped stream with a high velocity and a range two or three times greater (ideal for knocking down fires of high intensity before moving closer or for fires difficult to reach because of elevations or obstructions).

In its Handbook of Fire Protection, the National Fire Protection Association recommends that the wheeled dry chemical unit be inspected at intervals of not less than six months to insure that the nitrogen pressure has not decreased due to leakage or use. The pressure check is achieved through gages forming a part of the reducing valve assembly. All instructions as to proper operation and maintenance appear on the nameplate and should be carefully followed.

Automatic Systems

A more recent development is the introduction of piped systems for discharging dry chemical at fire-vulnerable locations, such as oil storage tanks, engines, transformers, ovens, printing presses, etc. Completely automatic in operation, the system utilizes thermostats to open the release valve of a nitrogen cylinder, which, in turn, forces the dry chemical powder through the fixed piping. Provision is made for manual operation and also for the automatic closing of fire doors, windows, ventilating ducts, etc., as desired.

Industrial fire losses have increased 68 per cent in the past ten years. At a time when industry is being called upon to step up defense needs and to sustain a strong civilian economy as well, effective fire protection procedure, in which dry chemical plays an important part, is indispensable.


1. Dry Chemical Unit
2. Heat Actuated Devices
3. Distribution Heads (Nozzles)
4. Nitrogen Cylinder Releases
5. Alarm
6. Devices to close doors
7. Devices to close windows
8. Switch off fans and blowers
9. Shut off motors
10. Devices to open drain valves
11. Remote Manual Control Station

The recent automatic pipe system to provide fool-proof protection against flammable liquid and electrical equipment fires in industrial plants. In case a fire starts, a heat-actuated device automatically reports a fire to the nitrogen cylinder release. Windows and doors are automatically closed, fans and motors are shut off, drain valves are opened and an alarm is sounded. At the same time, dry chemical is expelled through distribution heads in the pipes, and puts out the fire immediately. Shown here is a small paint mixing room. However, the piped system can be adapted for installation at many industrial fire hazards.

Pictures by courtesy of the Ansul Chemical Co.

CONTROLLING

In providing safety underfoot, you can also lower your maintenance costs and insurance rates, and have better-looking, better-preserved floors.

By HAROLD E. D'ARCY
Safety & Maintenance Consultant
Memorial Hospital, New York City

WHEN we at Memorial Hospital first started to dig into our problem of people falling, we made a study of what they were doing when they fell. Some fell from ladders improperly set, some fell from chairs being used as ladders, some fell on stairways, but by far the great number of falls were on the same level on our floor areas. There was no doubt that something had to be done about it.

We took care of the ladder and chair problem by teaching people the proper method of using a ladder and discouraged the use of chairs and other furniture to reach high places. We also found ways to clean stairs that kept them from becoming slippery, increased lighting capacity in the stair wells, removed any discarded materials that we found there, stopped using the landings to store brooms and buckets and, through these few improvements, cleaned up one of our minor troublesome problems.

But the big problem was what to do about the floors. We were maintaining them, as we thought, in a perfectly proper manner but we were not satisfied that they were as nonskid as we wanted them to be for protection of our personnel, patients and visitors. These falling accidents were causing our insurance costs to rise. We found there were accident costs that were not covered by our insurance, such as loss of take-home pay for the victim, valuable time lost to the professional people, time that money could not buy back, etc. What could we do about them?

We started testing many types of wax and cleaners and, truthfully, after many months were making no headway. The next logical step was to look for help outside our own organization.

From our own past experience there were four basic points we must use as the foundation to our building of an efficient anti-slip program: 1. Safety underfoot, 2. The impact of these accidents on our insurance costs, 3. Floor preservation and appearance, 4. Maintenance costs.

In order to find out something about the first point, we called in our insurance carriers and the help they gave was deeply appreciated. We learned that safety underfoot meant that the coefficient of friction should be such at all times that the walker has freedom in his own particular walking manner, and need not be constantly on guard protecting himself on slippery floors. Such conditions are fatiguing and result in loss of efficiency, physically and mentally, and the walker is prone to many other types (To page 34)

YOUR EYESIGHT AND YOUR

Jane has a headache.

Joe wears his safety goggles in his pocket.

Henry wears glasses, but the lens prescription is for reading distance, and not right for his job.

THE above are typical cases in any group of employees, and they all suggest the need for greater eye-consciousness.

Inadequate eyesight is a handicap to at least one out of three employees in business and industry, according to a study made by the American Optometric Association, covering millions of employees in hundreds of companies.

Almost all of this visual inefficiency could be prevented or corrected by proper care. With the aid of modern science almost everybody can have vision that is up to par or better for his job and for his recreational activities off the job.

Take eye accidents for instance. One occurs every 30 seconds in America. All but 2 percent could be prevented by adherence to well known safety rules. Many eyes have been lost by Joes who wore their safety goggles in their pockets. In addition to human suffering, eye accidents cost the country more than 400 million dollars in 1950.

Good vision is essential to safety in general. Every safety director has heard an employee say, "I didn't see," after a serious accident.

Eye Performance

This problem of seeing adequately for the job isn't as simple as one might think. Here are some of the essential visual requirements for safety and job performance:

1. Distant acuity—clearness of vision for each eye separately and both eyes together at a distance of 20 feet.

2. Near acuity—clearness of vision for each eye separately and both eyes together at the critical working distance, depending on the job.

3. Depth perception—ability to judge distance and space relationships so as to see things where and as they actually are.

4. Field of vision—ability to see over a large area to right and left and up and down while focused on a point.

5. Color discrimination, a shortcoming of about 8 per cent of all men and about 1 per cent of all women, and more important in some jobs than others.

"There are important differences in visual requirements for different jobs," according to Dr. E. H. Westland, chairman of the optometric association's occupational vision committee, who has long been a consultant on vision for industry. "A crane operator, for example, depends largely on good distance vision, and he must have depth perception and a wide field of vision if he is to be safe and accurate in picking up and putting down heavy loads among employees working below him.

"A lathe operator works at a distance of about 15 inches from his eyes, and he needs to be able to see the fine gradations on a micrometer. In considering his eyes we must not overlook protection from flying metal particles.

"A truck driver must have good distance vision for travel on the highway, good near vision for the paper work he must perform in connection with his loads, depth perception for judgment in passing other vehicles on the road and in parking, field of vision to detect danger from the side, and color vision to interpret road lights and identify color markings often used to distinguish different types of goods in his cargo.

"Most business and industrial jobs today require critical seeing within arm's length, and it is our near-point vision that deteriorates first. Nature apparently intended man to be an outdoor animal. His vision is best suited to primitive life when man lived out in the open in natural light, looked away to the horizon or stalked an animal a few yards ahead of him. Modern civilization places many burdens on our eyesight, and artificial aids are needed to protect it and bring it up to par as it declines in efficiency with age and improper use."

Correct Correction

Dr. Westland said that two out of three adults wear glasses, but many of them do not have proper lens correction for their working distances, and, consequently, al-

JOB

though they wear glasses their vision is not right for their particular jobs.

"No one has perfect vision," he said. "Almost everyone has some quality that is above par and that may make him especially suited to a particular job, even though he is below par in some other quality. It was recently found that girls who were extremely near-sighted were the best performers of an intricate looping operation in a hosiery mill which is done at a distance of about eight inches from the eyes. Their deviation from the normal was an advantage on that job, but of course they needed visual correction to live normally off their jobs."

Working Distance

One of Dr. Westland's recommendations is that when you seek visual care for your job you should explain your requirements in detail to your doctor so that he will give you the correction that serves your exact needs. Working distance is of great importance and usually lenses can correct your vision for whatever distance is required.

Visual Training

Visual training, or orthoptics, is sometimes recommended for visual problems which cannot be corrected by lenses. Such training can, for instance, greatly increase speed of perception, and it can develop better coordination to make the two eyes work together. It was used extensively during the war to train aviators in split-second distinction between friendly and enemy aircraft in the confusion of an air battle. Proofreaders have found it of great value in increasing their speed and accuracy, and it is helpful in many other occupations as well.

Too late now to put on those safety goggles. This is the way 98 per cent of all eye accidents occur—a well known safety rule is flouted.

Dr. Westland has found that neglected eyesight is more common in young employees than in those over 40.

"Shortly after the age of 40 almost everyone finds it difficult to focus and see easily for reading or a near-point job," he said. "As a result he seeks visual care and gets correction for any other visual problem that he may have, as well as his farsightedness. The younger employee, on the other hand, may fail to recognize that he has a visual shortcoming until it is dramatized by an accident or until something else prompts him to obtain a thorough visual examination."

He said that the day is coming when everyone will have his vision examined once a year, and as a result many eyesight problems will be prevented. Vision is your most precious sense, don't neglect it.

Corrective-protective lenses enable this lathe operator to see and to protect his sight.

What's your working distance? It is a vital factor in correction of vision for the job.

Pictures by courtesy of American Optometric Association.

VISUAL

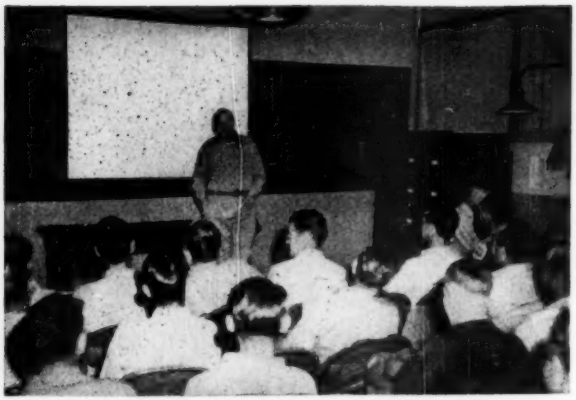


Figure 1. Safety meeting of Morenci Branch employees.

How various types of visual aids have been used successfully in accident analysis and safety training at the Morenci Branch of the Phelps Dodge Corporation.

By M. L. WILLIAMS, Mine Safety Representative, and ALLEN D. LOOK, Mining Engineer,

Both of the Bureau of Mines, Phoenix, Arizona

IN RECENT years the use of visual aids has expanded the field of safety education. This is a modern adaptation of a method employed in ancient times, when simple paintings and drawings were the only means of recording current events. In its present application, visual aid employs sound and silent motion pictures, stripfilms, lantern slides, descriptive posters, and color.

That this method of instruction is highly effective was demonstrated practically during World War II, when both industry and the armed forces, faced with the tremendous task of training thousands of men and women in new manufacturing techniques and the many phases of modern warfare in the shortest possible time, resorted successfully to visual instruction aids. Visual aids are being employed increasingly in industry and in our educational systems, and numerous publications are devoted to the technique of using them.

Safety promotion will always be difficult, and those engaged in it are constantly searching for new methods. It was only natural that progressive advocates of safety should recognize the possibilities of visual aids and should incorporate such aids in their accident-prevention programs.

Although a good many industries are now using visual aids in some form for teaching operating methods and safety, only those in use at the Morenci Branch, Phelps Dodge Corp., Morenci, Ariz., will be discussed here. The use of visual aids in the safety program at Morenci is reported to have caused no appreciable increase in the cost of operating the safety department.

A substantial decline in the accident-frequency rate from 8.37 in 1945 to 5.23 in 1949 is attributed largely to the increased interest in safety developed through the use of visual aids at the monthly safety meetings. In addition, the accident severity rate was reduced from 1.74 in 1945 to 0.185 in 1949.

FEATURE

This is the second of a series of three feature articles on Educational Aids. The next article of the series will appear in the January issue of SAFETY MAINTENANCE & PRODUCTION.

General Information

Prior to 1945, the use of visual aids at Morenci was limited to bulletin boards, safety posters, color coding of pipe lines, and the usual warning signs. In 1947, a standard code for dimensional-color painting of shop machinery was adopted.

Films and slides were first used in the autumn of 1945 to supplement the employee monthly safety meetings, and the increased interest of supervisors and employees stimulated development of the present program.

Visual aids to safety education are presented to the employees at every safety meeting either in the form of 16 mm. sound films, 35 mm. filmstrips, or 2- by 2-inch slides. At least half of each 30-minute meeting is devoted to these means of safety training.

Visual-aid equipment is used effectively in reporting and discussing accidents and property damage resulting therefrom. Black-and-white photographs supplement each written report of an accident or property damage. Enlarged photographs of selected accidents, together with pertinent details of the accident, are posted on safety bulletin boards. Color transparencies also are made for later use at the monthly safety meetings.

Safety bulletin boards, safety post-

ers, and the use of color codes are an integral part of visual education in safety and are used advantageously at Morenci.

Equipment

The good results obtained from the use of visual aids at Morenci are attributed, in part, to the effective use made of the excellent equipment provided. This equipment consists of: still cameras, motion picture cameras, dual-speed record player with amplifier for use with stripfilms, light meter, portable projection screen, kit for binding 2- by 2-inch glass slides, microphone and stand used in conjunction with silent 16 mm. motion picture films and stripfilms, library of catalogs and publications pertaining to film sources, library of stripfilms, file boxes for glass slides.

A 12- by 12-foot dark room is equipped for developing and printing of film. The equipment includes a 4 x 5 enlarger and a 4 x 5 contact printer.

The safety meeting rooms at the mine and at the reduction plant are especially equipped for showing films, stripfilms, and slides. A 24- x 31-foot room at the reduction plant and a 20- by 30-foot room at the mine are each equipped with a large wall projection screen, permanent stand for projectors, large blackboard, table, and seats for about 80 persons. The windows are blackened to provide maximum darkness when the projector is used. Another room—16 x 20 feet—at the reduction plant is similarly equipped for the convenience of the smelter employees.

In addition to safety posters, accident-record boards keep employees alert to safety goals.

Figure 2. Moving and still pictures are taken of "reenacted" accidents for use in analysing the causes of accidents and for showing at employee safety meetings.

Investigating and Reporting Accidents

All lost-time accidents and also most of the accidents that do not involve personal injury are investigated. Every effort is made to investigate an accident "on the ground" as soon as possible while the pertinent details are fresh and clear in the minds of witnesses. From their version of the accident, it is reenacted and photographed in black-and-white and color. Witnesses ordinarily cooperate wholeheartedly in "acting out" the accident. Figure 2. shows such a reenactment after a track-laying accident, in which a spike hammer was deflected from the rail and struck a worker in the face.

The press camera is used in obtaining black-and-white photographs, which can be processed quickly. Such photographs, together with pertinent descriptive titles, are used to supplement the written report of the accident, providing a pictorial record that adds emphasis to the written word. Property damage reports, usually for insurance or litigation purposes, also are accompanied by photographs. Copies of such photographs are placed in a loose-leaf album and constitute a photograph index of all accidents.

The miniature camera is used for making color transparencies, which are taken in duplicate. This miniature camera, using eight-exposure film rolls, was selected over other miniature-type cameras that ordinarily use 20- or 40-exposure film rolls, because of its superior speed and economy. The 20- or 40-exposure film rolls contain more exposures than are needed to obtain a photographic record of a single accident, and their use results in either a waste of film to obtain a few exposures or an indefinite delay until the remainder of the film can be exposed.

Exposed color film is mailed to the nearest processing laboratory,

where it is processed and each transparency is mounted in a cardboard slide. The safety engineer examines the returned transparencies with a hand viewer and selects those appropriate for his use. The selected transparencies are then mounted in 2- by 2-inch glass slides, which, when completed, are carefully titled, classified, and indexed for use at safety meetings to supplement discussion of accidents.

The details of every lost-time accident in 1948 and the years following were recorded and photographed in black and white and in color and provide an invaluable source of reference material. If any particular type of accident should become prevalent, a series of slides on that subject is taken from the files and shown at the monthly safety meetings. Color gives a realistic quality to the depicted scenes. The effect is heightened further by the knowledge that each picture is a colorful reenactment of an accident with which the audience is familiar.

Job Training

Two job-training films have been completed: (1) "Track Work" and (2) "Laying Track Section." Both are directed primarily at new employees, who generally are assigned to work on the tracks. Each film is in black and white and is about 400 feet long. At present another film, to be entitled "Railroad Signaling," is in the project stage.

Before a new employee is assigned to any job, he is sent to the safety department, where he receives his primary instruction in working safely. This instruction includes visual demonstrations of the protection provided by the various articles of protective clothing he will be required to wear on the job and the proper way of lifting to avoid strain. A short lecture on general safety practices by the safety engineer is followed by an instruction stripfilm with a transcribed commentary, which emphasizes the safety engineer's previous instruction.

At intervals during the year, all employees receive visual instruction on pertinent safety subjects at their monthly safety meetings. These instructions are given by means of stripfilms with recorded commentaries, supplemented by 16 mm. sound films on current subjects such as safety on the highway and in the home.

Both strip and 16 mm. films are purchased, rented, or borrowed from various sources. A library of film sources is kept up to date for this purpose.

The monthly safety meetings at Morenci provide an ideal arrangement whereby all employees benefit by viewing these slides, stripfilms, and sound films. The meetings are held during the working shift, and attendance is compulsory. To allow every employee to attend the monthly meetings necessitates holding an average of 50 meetings every month. In 1949, 610 such meetings were held, and slides, stripfilms, or 16 mm. sound films were shown at each. Each meeting lasts about ½ hour, of which not more than 20 minutes was devoted to films or slides and the remainder to discussion.

On-the-job safety meetings are held for employees who are unable to attend the large day meetings because of special duties or because of working on an afternoon or evening shift.

Other Visual Aids

Before the advent of motion-picture films, stripfilms, and slides, visual safety aids were limited to bulletin boards, safety posters, and safety signs. These, however, are an integral part of visual-aid instruction in a successful safety program.

Effective use is made of safety bulletin boards, safety posters, and identification signs at Morenci. Their effectiveness is due to their simplicity and eye appeal.

Safety bulletin boards at the reduction plant and at the mine are strategically located at each time office. These boards are used exclusively for information, notices, and posters pertaining to safety. Notices that pertain only to outside activities or to general matters not related to safety are posted on separate bulletin boards provided for such notices. After the notices or bulletins have served their purpose they are removed promptly. They are changed at least once a month and are not allowed to accumulate on the boards.

Accident photographs sometimes are displayed on the bulletin boards. One typical display (To page 50)

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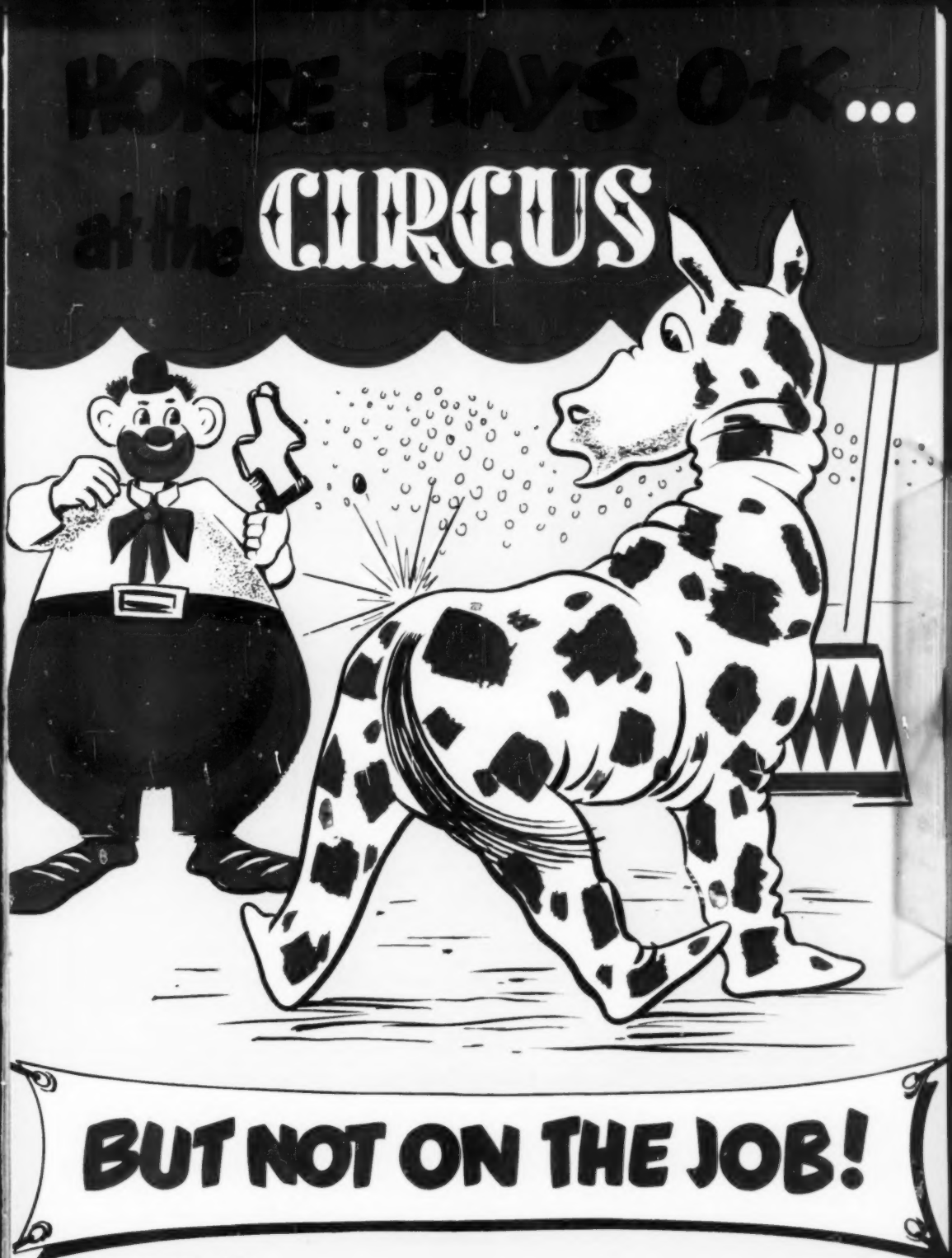
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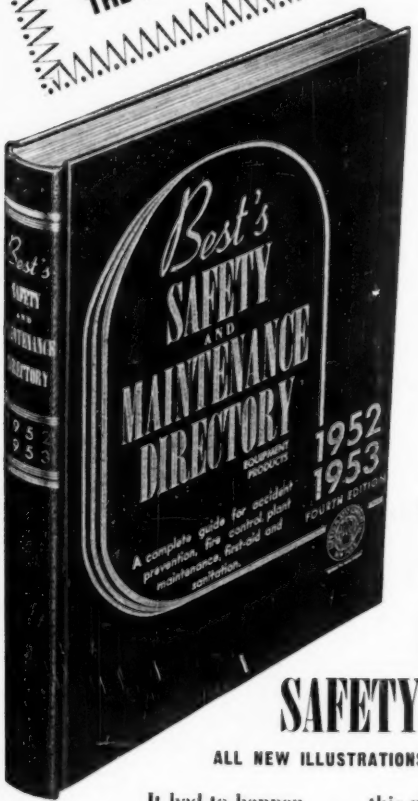
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SAFETY IN HIGH PLACES

How to handle and use ladders safely.

By LINCOLN H. LIPPINCOTT
Manager, New Haven Safety Council

FALLS rank second among causes of industrial injuries. Falls from ladders are frequent and often serious. Even when no injury occurs a ladder accident indicates that something is wrong. If the wrong practice is continued, a severe injury may result. In some cases the individual falling escapes hurt. A fellow worker is the sufferer. Recently a fireman fell unhurt from a ladder and the man holding the bottom of the ladder, who broke his fall, went to the hospital with fractured toes. A man's wife was helping him in a similar fashion. He fell without injury, but struck her in such a way as to break her leg.

Value of Orderly Procedure

We can apply to ladders the plans that have brought us increased safety in other parts of our work. An effective method is to have a definite order. Through practice this order becomes a habit. These good habits warn us whenever we start to do the dangerous thing.

For greater ladder safety follow seven definite steps in logical order. These steps are: 1, SELECTION; 2, EXAMINATION; 3, PLACING; 4, CLIMBING; 5, WORKING ON; 6, DESCENDING; 7, REMOVING. All apply to the use of portable ladders, but 4, 5 and 6, also affect safety on fixed ladders as well.

FEATURE

This is the first of three feature articles concerned with Off-the-Ground Safety. The next two articles of the series will be published in the January and February issues of SAFETY MAINTENANCE & PRODUCTION.

1. Selection

Be sure to use the proper ladder for the job. What kind of ladder will serve: a step ladder, a single ladder, an extension ladder? How long shall it be? Shall it be wood or metal? Are you going to use it to gain access to a fixed platform on which you will work? Are you going to stand on it while you are lifting a heavy or bulky object? Are you going to stand on it while you are using a light or heavy tool? Will you be standing on it only for a short time while you make a connection, turn a valve or tie a rope? Will you need both hands free for your work? Will you be near any material that may be carrying electrical current?

Let's consider the last point first. If there is any possibility that you or the ladder may come in contact with an electrically charged surface, do not use a metal ladder.

If the ladder is to be used merely to reach a point, then it must be strong enough to sustain your weight while climbing. If you (To page 46)

Fig. 1. Narrow assembly area uniformly lighted to 40 footcandles by a staggered system of 1000-watt mercury and 1500-watt incandescent lamps in aluminum high-bay reflectors mounted 50 feet apart on 35-by-40-foot lamp spacings.

Plan Your

The complete safety, easy maintenance and efficient production of an industrial plant require that the illumination for a given area be adequate for the seeing tasks involved. Here are some suggestions for planning a safe, economical and effective lighting system for offices and factories.

FEATURE

This is the third of a series of three feature articles on Industrial Lighting. The first two articles, dealing with light maintenance and textile mill lighting, appeared respectively in the October & November issues of SAFETY MAINTENANCE & PRODUCTION.

STATISTICS compiled from the records of the National Safety Council show that an average of 270 million man-days were lost each year during World War II because of industrial accidents. This huge loss of man-days represents the work of approximately 900,000 men in completing 56 large battleships or 5000 B-29 bombers. While casualties on battlefronts, the high seas, and in the air were made public, little or no mention was made of the yearly average of 18,000 industrial workers who lost their lives in war plants where no hostilities existed.

Most of the accidents were listed as "falls," and "hand" and "foot" injuries, but in many cases the hidden cause, which often escaped the notice of safety investigators, was the worker's inability to see easily and quickly.

When an employer hires a person for factory work, he hires hand-skill and brain-skill, but unless the person can see efficiently, these skills are of little use. Light permits a person to see and distinguish large objects, but a required quantity of good quality illumination is essential where fine visual tasks or close seeing are to be undertaken.

Aspects of Planned Lighting

Because industrial interiors vary widely in area and ceiling height, and because some visual tasks re-

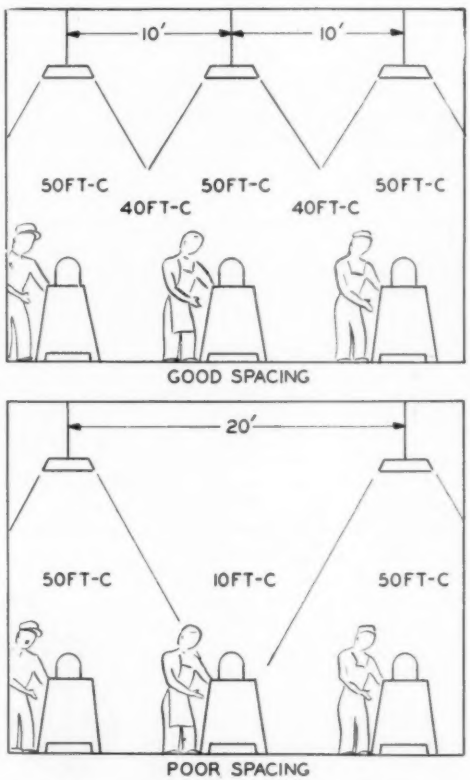


Fig. 3. For uniform and adequate illumination, the proper ratio of spacing to mounting height is important in lighting planning.

Lighting

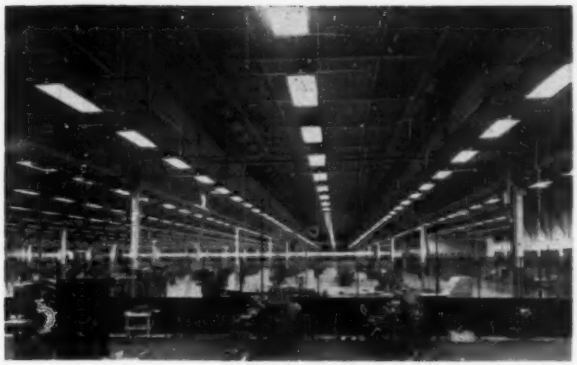


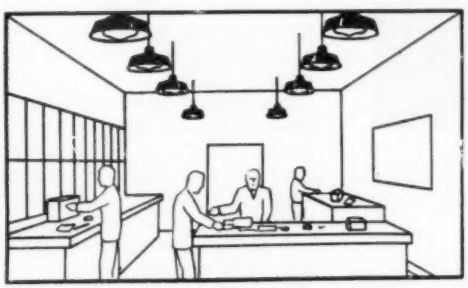
Fig. 2. Wide machine area lighted to 35 footcandles from 2-lamp 90-watt fluorescent units mounted at a height of 15 feet on spacings of 10 by 13 feet.

quire more light than others for ease of seeing, the lighting system must be planned with respect to conditions as they exist or will be in a new structure.

Where poor lighting is replaced with a planned lighting system, there are fewer accidents, production automatically increases, and the morale of employees generally becomes higher—all because the workers can see better.

By
ROBERT L. ZAHOUR
Westinghouse Electric Corporation
Bloomfield, N. J.

Planned lighting for industrial interiors may be classified into three general types: (1) general lighting; (2) localized general lighting; (3) supplementary or local lighting.



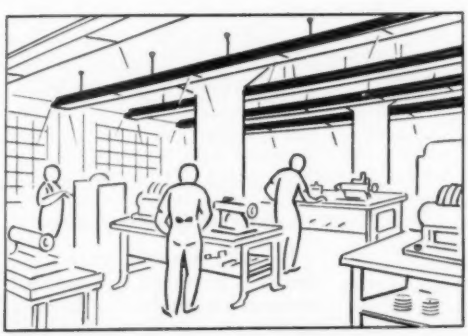


Fig. 4. Medium and low bay areas may be lighted with either fluorescent or incandescent equipment. A cost analysis will determine economies and advantages in selecting various types.

General Lighting

For Narrow Interiors with High Ceilings of 30 feet or more, lighting equipment that concentrates the light in a relatively narrow beam is desirable to direct the illumination efficiently to the working areas below (Figure 1). The lighting fixtures may be either incandescent or mercury vapor, alone or in combination. Where color discrimination is not important, mercury lamps are more advantageous because of greater life and higher efficiency, hence fewer fixtures may be used at wider spacings. If color correction is desired, at least 20 per cent of the total lumens should be provided with incandescent lamps. However, the great difference between the life of the mercury vapor and the standard incandescent lamp will pose a maintenance problem. Frequently the filament lamps are not replaced when they burn out, and the light is then deficient both in quantity and color quality. To avoid this situation the color-corrected type of mercury lamp can be used throughout the area. While the light produced by this lamp does not provide color rendition as good as that of incandescent lamps or standard tubular fluorescent lamps, it is satisfactory for all industrial ap-

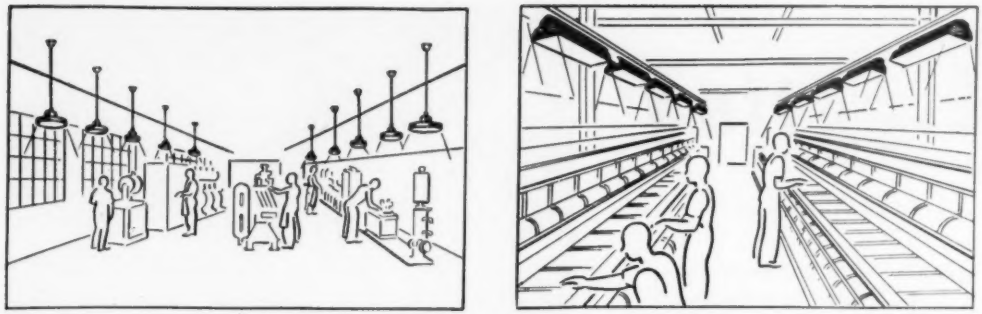


Fig. 5. Methods of applying localized general lighting over specific areas.

plications where color is not of special importance.

For Wide Interiors with High Ceilings, high bay lighting equipment with medium or wide distributions can be used effectively to provide greater overlapping and more uniformity of illumination (Figure 2). This practice also provides a higher vertical surface illumination. In a plan of this type, it is good practice to use high bay concentrating equipment in the rows of fixtures adjacent to the building walls to minimize loss of light through wall and window absorption.

From the standpoint of lamp maintenance, mercury vapor lamps are the most suitable in these high bay areas. Where low-brightness sources of a diffusing character are desired, as where specular materials are being fabricated, fluorescent lamps are desirable and are practical where catwalks or cranes make it possible to replace burned out lamps conveniently.

Fig. 6. Continuous row of 2-lamp 90-watt fluorescent lamp RLM reflectors suspended over each inspection bend provides approximately 100 footcandles. Specially designed indirect reflector at right gives desired light for inspection.

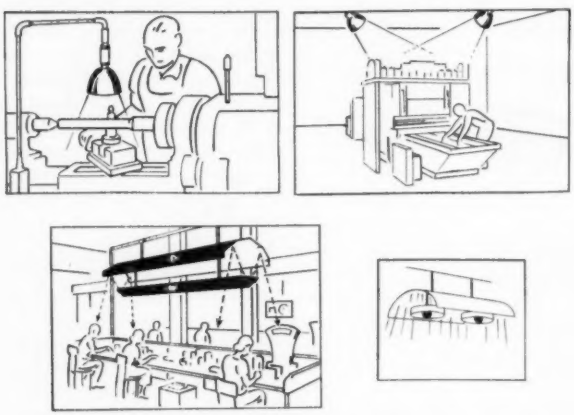
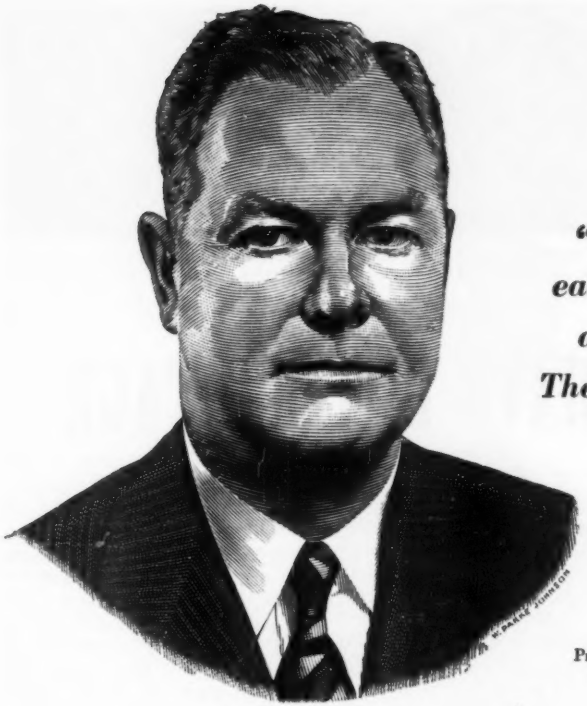


Fig. 7. Methods of applying local lighting where high levels are required.

For Medium and Low Ceiling Areas where mounting heights do not exceed 18 feet, lighting equipment of wide angle distribution should be selected to produce uniform illumination. The ratio of fixture spacings to mounting height is particularly important especially in low ceiling installations (Figure 3). While general illumination can be provided with either incandescent or fluorescent lamp equipment (Figure 4), fluorescent lamps offer advantages of economy in lamp maintenance, higher intensities at lower operating costs, better distribution, and less heat for human discomfort.

Localized General Lighting

In many industrial plants, machinery is positioned in a way that makes it desirable to hang the lighting fixtures over the working areas that constitute the critical seeing task. The sketches in *(To page 30)*



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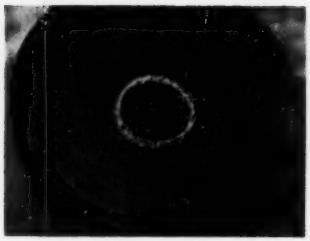
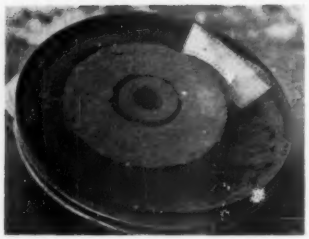


In the third stage of decomposition, film has some soft spots and emits noxious odor.

By the fourth stage, the entire film has softened, coagulated and become frothy.



In the fifth and last stage, the film has disintegrated into a brownish acrid powder.

OLD FILMS HAVE HOT FOOTAGE

Badly decomposing cellulose nitrate motion picture films can cause serious fires by spontaneous ignition.

INVESTIGATIONS by the National Bureau of Standards have shown that spontaneous ignition of cellulose nitrate motion picture film can occur when such film is in an advanced stage of decomposition. Prior to this work it was generally believed that nitrate film would not ignite spontaneously at temperatures ordinarily encountered in a film vault. Tests made by A. C. Hutton of the NBS Fire Protection Laboratory and conducted in cooperation with the National Archives have provided the necessary information to prevent recurrence of the severe fire losses to film and storage facilities that have been experienced in recent years.

In New York City and adjacent areas during the abnormally hot summer of 1949 numerous fires occurred involving cellulose nitrate motion picture films. These fires started in processing and reclamation plants and in film storage facilities. Losses, other than those of real property, were great, the majority of the films destroyed being original negatives and master copies, some dating back to the "silent era." In studying storage conditions the National Archives and NBS engineers found no evidence that the fires were due to the negligence of personnel or the careless use of cigarettes or matches; instead, the fires appeared to have originated through the spontaneous ignition of deteriorated nitrate films.

Samples Tested

At the request of the National Archives, therefore, the National Bureau of Standards instituted an investigation of spontaneous ignition as an inherent hazard with nitrate film. Samples in various stages of decomposition were supplied by the National Archives for the purpose of simulating conditions which may have prevailed at the fire locations. These samples were stored in a special chamber, the temperature of which was controlled and recorded. Each film was packed in an individual can which was in turn wrapped in mineral wool to retain the heat of the exothermic decomposition reaction. The ambient temperature in the chamber was initially 95°F and, at intervals, was increased by small increments, but always maintained below that of the reacting film.

At a chamber temperature of 106°F, one roll of film in the more advanced stage of decomposition was found to be increasing in temperature at an accelerating rate. On the 17th day of storage, with the chamber temperature still at 106°F, ignition of the film occurred. Its temperature at the time had reached 140°F. Other rolls of film under the same test had slower rates of temperature increase. With the chamber held at 120°F, another case of spontaneous ignition occurred when a roll ignited after self-heating to 150°F.

Self-ignition temperature is dependent upon a number of factors and therefore was not the same for any two samples. The lowest temperature leading to ignition was 106°F. Because the number of samples investigated was small, it is doubtful whether this is the lowest temperature at which a reel of deteriorating film will self-ignite.

Safe Storage Methods

The results obtained in the NBS tests indicate that good film does not self-ignite at ordinary storage temperatures. In one of the government

film depositories large quantities of cellulose nitrate film have been stored in standard vaults in which the temperatures are maintained at about 70°F by an air conditioning system. Several inspections of film in these vaults did not reveal evidence of serious film decomposition. This indicates that relatively low temperatures will materially decrease the possibility of a fire by spontaneous ignition and at the same time preserve the film for its intended purpose.

The logical approach to safe storage is the removal of all film showing signs of deterioration. Such film can readily be found by scheduled inspections of stored film stocks. Inspection personnel should be trained to recognize decomposing film by appearance, and to classify its condition according to the following categories. In the first stage of deterioration the photographic portion usually shows an amber discoloration with fading of the picture image. In the second stage, the emulsion becomes adhesive and the film convolutions tend to stick together during unrolling. Film in the third-stage of deterioration has portions which are soft, contain gas bubbles, and emit a distinctive noxious odor. In the fourth stage, the entire film is soft; its convolutions are welded into a single mass, and frequently its surface is covered with a viscous froth. The same noxious odor, only stronger, is in evidence. In the fifth and final stage, the film mass degenerates partially or entirely into a brownish acrid powder.

Deteriorated film in the first and second stages is photographically reproducible. When the subject matter is important, the film can be copied and the original destroyed. If the material is not valuable, the film should be destroyed at once. Adhesiveness prevailing in deteriorating film often causes the emulsion to become detached from the base while unrolling. Generally, this can be prevented by slowly unrolling the film in a bath of carbon tetrachloride under precise laboratory controls and in an (To page 33)

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Plan Your Lighting

(From page 26) Figure 5 illustrate localized general lighting schemes. There are cases where general lighting must be localized over machine working areas, while in other instances fixtures are located with reference to inspection operations (Figure 6).

From the standpoints of economy of operation, uniform distribution and lighting quality, and coolness, fluorescent equipment is usually desirable for these applications.

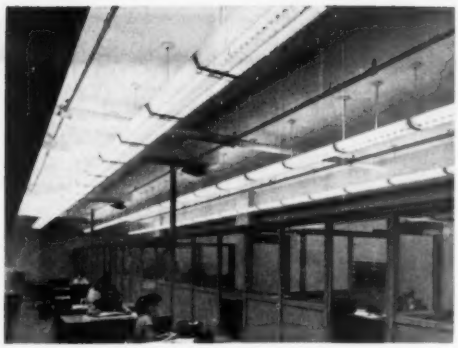

Fig. 8. Plant office is uniformly lighted to 65 footcandles from rows of direct-indirect, louver-bottom 40-watt fluorescent fixtures suspended 11 feet above the level of the floor.

Supplementary or Local Lighting

When the general room lighting does not provide sufficient illumination for a critical seeing task, supplementary or local lighting should be employed (Figure 7). Localized tasks such as fine bench or machine work, or fine buffing and polishing, require from 100 to 200 footcandles of illumination. While general room lighting may average 30 to 50 footcandles, an additional amount must be provided to supplement this general level. Space limitations and fixture dimensions often restrict the choice between fluorescent and incandescent schemes, while in other cases the reflecting character of the work or machine surfaces may be a deciding factor. Furthermore, special or unique types of inspection operations or machine processes may require a local lighting application that cannot be supplied with available standard equipment. In this event, specially designed fixtures must be built to provide the necessary lighting requirements as shown at right in Figure 6.

Factory Drafting Rooms and Offices

The seeing tasks in the average office are numerous and sometimes very exacting. Eyes are used at close range for severe visual work such as reading fine print, typing, duplicating, poor handwriting, penciled stenographic notes, and office forms.

Recommended lighting practices issued by the Illuminating Engineering Society, specify a minimum of 30 footcandles for ordinary visual tasks and 50 footcandles where critical seeing is involved. The need for high efficiency, low cost of maintenance and operation, good quality of light distribution, and coolness of sources influences many general offices to employ fluorescent luminaires. A direct-indirect system is illustrated in Figure 8.

The basic lighting and seeing requirements in drafting rooms are similar to general offices, but the seeing tasks are more critical. Draftsmen object to shadows and reflected glare, especially if working on horizontal tables, because reflections make fine lines and faint details difficult to see. While indirect lighting will minimize these objections, there is a definite advantage in tilting drafting boards to within 15 or 20 degrees from the horizontal, and employing a more efficient lighting system of semi-direct fluorescent diffusing equipment installed in rows slanted at 45 degrees in relation to table locations (Figure 9). With this type of overhead lighting and partial tilting of boards, soft shadows occur beneath rules and straight edges where they are of no handicap, while reflected images of light sources on glossy paper or tracing cloth fall below eye level rather than in the viewing area.

Fig. 9. Semi-direct luminous-bottom fixtures holding 40-watt fluorescent lamps are oriented 45 degrees with location of drafting tables and provide 65 footcandles of illumination.

Lighting Must Be Planned

Like any vital engineering project, lighting must be carefully planned to produce desired results. The process of analyzing lighting needs for given seeing tasks, the selection of efficient equipment that will produce the quantity and quality of light required, and the choice of wall and ceiling finishes for best utilization of light all enter into the planning of a system. Many of these decisions are associated with established tables of design data supplemented with characteristics of lamps and fixtures, and applied in accordance with recommended practices. Besides, there may be cases where two or three types of installations will produce the results desired, yet a cost analysis will reveal the most economical scheme for a time period of operation. Hence, for a well-planned system, the services of a competent illuminating engineer are recommended.

Maintenance

To give peak performance, a lighting system must have periodic maintenance. Dust and dirt allowed to accumulate on the lighting equipment absorbs light which is paid for, yet never reaches the working areas. In a year's time accumulations of dust and dirt on light-reflecting surfaces and lamps frequently reduce the delivered illumination as much as 30 per cent, and even greater reductions occur in extremely dusty or dirty areas.

Another light loss results from lamp aging. While this normal characteristic of lamps is not preventable, it has been determined an economy, from light output depreciation curves, to replace any lamp after it has burned 70 to 100 per cent of its rated life. Lamp outages produce no light and consequently reduce the lighting intensity of the system.

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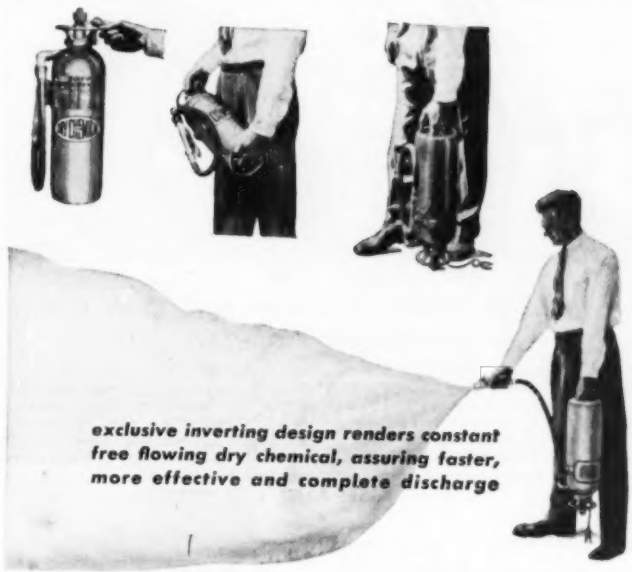
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tion, may no longer be adequate to carry the additional load that was added piecemeal. Wiring that will provide the required voltage at the lamp sockets is a good investment. An appreciable reduction in light output results when lamps are operated below the voltage for which they were designed. In the design of lighting systems, consideration also should be given to adequate wiring in order to obtain best lamp performance. The chart, Figure 10, indicates approximate wiring capacities in terms of watts required per square foot of floor area to provide given footcandle intensities with the various types of luminaires illustrated.

Pictures by courtesy of Westinghouse Electric Corp.

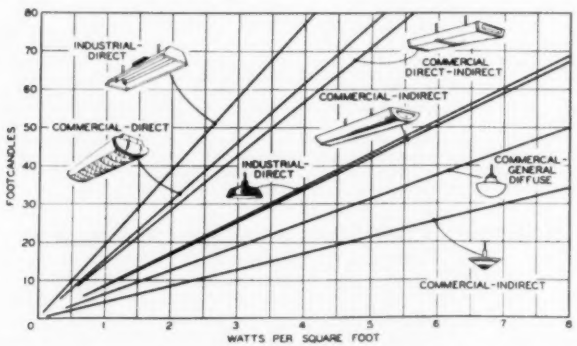

Fig. 10. Chart showing wiring capacities required for given footcandles.

Maintenance Problems To Be Discussed

PLANS for the third Plant Maintenance Conference, to be held concurrently with the Plant Maintenance Show at Convention Hall, Philadelphia, Jan. 14–17, call for the most intensive examination of maintenance problems ever undertaken, it was announced by Clapp & Poliak, Inc., the exposition management.

Thirty-four separate discussions will be conducted. More than 100 experts, drawn from industrial firms all over the country, will lead the panels. Ten thousand maintenance executives are expected at the show and conference. L. C. Morrow, consulting editor, "Factory Management & Maintenance," is chairman.

Six general conferences, 27 sectional meetings and the annual banquet are scheduled. General conferences will consider basic problems of all industry while the sectional meetings will be devoted to specialized subjects of interest to particular industries.

Conference Subjects

General topics include: "Introduction," and "Maintenance Costs," on the first day; "Inspection Methods and Records for Preventive Maintenance," and "Planning and Scheduling Maintenance Work," on the second day, and Training Maintenance Workers and Supervisors and "Lubrication," on the third.

Also on the first day, five sectional sessions will take up project preparation, maintenance in plant buildings, in chemical plants, in metalworking plants, and for electrical equipment.

On the second day, there will be six sectional conferences on problems peculiar to the size of the plant and the maintenance it requires. Four such conferences will discuss the small plant, in groupings of 1–10 maintenance employees; 11–50; 51–100, and 100–300. A fifth will consider medium sized plants of 301–800, and the last, to large plants,

with more than 800 maintenance employees.

On the last day of the conference, 16 round-table groups will meet. Topics include organization of personnel; maintenance operating policies; safety and plant protection; plant housekeeping; welding; maintenance of mechanical equipment; maintenance of power plants and service equipment, and maintenance applications of handling equipment and its upkeep. Also included are sessions devoted to maintenance in aircraft plants; food plants; glass plants; oil refineries, printing plants; pulp and paper plants; textile plants and wood-working plants.

Maintenance Show

Two hundred companies will display products and services necessary for maintenance. Both conference sessions and exhibits will place the principal stress on preventive maintenance. The exhibit area will cover four times that of the first show.

Advance registration cards and hotel information may be obtained from Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

Old Films

(From page 29) adequately ventilated area. In the third stage, only small portions of the film may be reproducible. When of sufficient value, such portions should be separated and copied; the original should then be destroyed. Film in the fourth and fifth stages is photographically worthless and should be destroyed at once without further consideration.

Inspection Hazards

During the initial inspection of film storage facilities it is quite possible that a relatively high proportion of film in advanced stages of decomposition may be found. The opening of cans containing such film may liberate quantities of noxious and toxic gases into the working area. Personnel exposed to these gases often experience nausea, headache, and other unpleasant symptoms if the ventilation is inadequate. Inspection personnel should therefore be given periodic rest periods in fresh air.

When films in the third, fourth, and fifth stages of decomposition are designated for disposal, they should be submerged immediately in water-filled drums, carried to a remote, uninhabited area approved by fire authorities, and destroyed by burning. The area or ground on which the film is to be burned should be free of brush, grass, leaves, and combustible litter. Burning should be confined to batches of not more than 25 pounds because the heat from larger amounts of film creates a strong updraft which may bear fragments of burning film considerable distances, thus endangering neighboring properties. Under no circumstances should films be burned in an inhabited area or within a building. The rapid production of gases during burning makes it extremely dangerous, particularly if the film is burned in a

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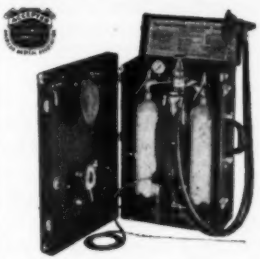

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furnace or confined space. During test fires in a well vented vault, engineers of the Interagency Advisory Committee for Nitrate Film Vault Tests recorded pressures as high as 18 pounds per square inch. No ordinary furnace structure could withstand such pressure; its breeching would fail, thus filling the furnace room with flames and poisonous gases.

Pictures by courtesy of National Bureau of Standards.

Occupational Vision Conference in Atlanta

BETTER vision programs as a tool for gearing up defense production and reducing man-hour loss are being stressed at the 4th annual Occupational Vision Congress at Georgia Tech in Atlanta, October 4 and 5.

The event is made possible by close teamwork among educators, industrial executives, ophthalmologists, optometrists, lighting and painting engineers, safety engineers and industrial nurses in working for the visual well-being of employees.

Nationally-known figures in the industrial and professional fields are scheduled to discuss conservation of vision, safeguarding the eyes from injury and the proper seeing environment for maximum employee efficiency.

Speakers at previous congresses have reported increases in production by as much as 20 per cent, lowered absenteeism of 35 to 50%, and half as many accidents as a result of vision programs.

The 1951 congress is sponsored by the Engineering Extension Division, Georgia Institute of Technology; the Associated Industries of Georgia, the Cotton Manufacturers Association of Georgia; the Georgia Industrial Nurses Association; The Georgia Optometric Association, the Georgia Society of Ophthalmology; the Industrial Hygiene Division, Georgia State Health Department; and the Illuminating Engineering Society.

Slips and Falls

(From page 15) of accidents. In hospital rooms and corridors, the visitor and the hospital personnel can use his or her own particular type of walk swing, but the patient sometimes must use a crutch or walk at a distorted angle. Therefore these patients are definitely accident prone every time they move.

Insurance Costs

In the study of insurance costs we found the cost was going up because of an ever-increasing number of accidents. 57% of these accidents were caused by people slipping on our floors; and of all types of accidents, the falling accident was the most serious and the most costly because it involved incapacitating injuries including fractures. Because of this, we concluded that these increased costs should be assessed against our maintenance costs, inasmuch as our method or materials, or perhaps both, were the direct cause.

Our insurance carrier gave us a number of names of manufacturers of materials they thought we should test on a comparative basis to find whose materials would best serve our mutual interests. When we were ready to start these tests we made up a program of what must be accomplished. As a measuring stick for running the tests of various materials, we must determine:

A. Safety underfoot.
B. Preservation of the flooring.
C. Appearance.

The first requirement was that the polish must have a satisfactory coefficient of friction to create safety underfoot or a safe surface for people to walk on with a perfectly normal stride.

Floor Preservation

We have thousands of square feet of linoleum, asphalt tile, rubber tile, marble and terrazzo flooring that cost many thousands of dollars to install, and today would cost us twice as much to replace. The resilient floors must have a protective finish capable of withstanding the abrasion of traffic, the moving of mobile equipment and the spillage of various chemicals, medicines, alcohol, urine, etc.

It is of the utmost importance that the polish we select must form a tough durable film to preserve the floor and enhance the beauty of the flooring. When these floor coverings were selected they were to play a very important part in the overall decorative scheme of things. The architects and decorators did not order an olive green floor hoping that, with the passing of a few years and so much bad maintenance, the floors would turn a dirty reddish brown. Therefore the polish and cleaning materials must be capable of bringing out and sustaining the natural beauty of the floor.

After drawing up this blueprint and specifications to guide us, we

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came to the fourth part of our considerations.

Maintenance Costs

While all the qualifications required have been well defined in our blueprint to attain this goal, it must still be accomplished within the framework of our budget. Not only must the material be economical in itself, but must not increase our labor costs.

We now have our blueprint completed, and are ready to start our tests. We called in a representative of each of the manufacturers the insurance company had recommended to us and presented our problem.

Each manufacturer was given an opportunity to present his materials and have one of his men supervise their application. We assigned to each product to be tested the entire area of one floor. This was done to prevent any possibility of one product's being carried by foot onto another which could possibly influence the final result. As each test was made we timed each separate operation, the amount of material used, the number of man hours and evaluated the final result for safety, luster and durability. Future maintenance of the test areas was in strict accordance with the manufacturers' directions. We made daily inspections of each area, noting the day-to-day reactions of these products to non-slip and scuffing qualities, the number of man hours of labor each day in maintenance. As time went on, one by one we eliminated a product from further consideration until we had one that, in our judgment, filled our particular needs.

Having concluded our test, we were now ready to put the final product into general use throughout our hospital. This was a big job in itself. It meant changing the old methods and training our labor to the new way of doing things. Once again we had to plan this new method to avoid confusion and mistakes. As a result we set up an entirely new system of maintenance on an engineering plane and proceeded with the job. At the same time that tests on our resilent floors were being run, we ran other tests with various cleaning materials on our marble, quarry tile, and terrazzo flooring, and found satisfactory materials for these types that in one operation gave better appearance and safety underfoot at the same time.

As a result of our efforts we have been well rewarded. We today have:

1. Safety underfoot. We have reduced our falling accidents to an irreducible minimum. The only ones we still have to contend with are those caused by persons who are incapacitated and would fall on any walk-way surface or deliberately, or otherwise, disregard warning signs used by our people in every cleaning and polishing operation we undertake.

2. Our insurance costs were next in line. Since establishing a new system of maintenance, our insurance costs have gone down, and are today the lowest we have ever ex-

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Water-Cooled
SMOKE MASK
Equipped with "Nod & Shake"
Fog-Proof, Gas-Tight Goggles
For combined eye and lung protection of painters, foundrymen, smelters, oil refiners, chemists, firemen, etc. Sponge filter, soaked in water before wearing, keeps out paint spray, smoke, fumes, dusts; provides cool, clean air at every breath. Air-tight goggles give absolute eye protection. Goggles are fog-proof too.
Sample sent $5.00 pp
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DUPOR No. 20
Water-Cooled Respirator
Double sponges dipped in water before wearing provide cool breathing even under hot, smoky conditions. Recommended for use of workers in paint shops, foundries, steel mills, oil refineries, chemists, firemen, etc. Face mask is of rubber, equipped with DUPOR "controlled breathing" valves. Wearer has a panorama view with no blind spots. Glasses or goggles can be worn with unit.
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perienced.

We are constantly alerting our personnel to the importance of keeping our walking areas free from extraneous material and loose litter.

We are using a method of damp sweeping that keeps our floors free of lint and dust. It consists of a push broom covered with a piece of cotton cloth that has been dampened with cold water, and our floors are swept in this way. Today we remove the dust and lint, not just stir it up into the air to fall right back on our floors.

3. As to preservation and appearance, our floors have more protection against the abrasion of traffic and mobile equipment than they ever had. Certainly they are by far better in appearance.

4. Now to a very important part . . . maintenance costs. During these tests we learned a very valuable lesson. In previous years we had bought our waxes pretty much on a cost basis. We had not given very much thought about quality. How wrong we were! Do not be the cynic or man who knows the prices of everything and the value of nothing. Today we know the difference between cheap material and quality material. We have reduced both our material costs and labor costs through our new system of maintenance. The per square foot cost of maintenance of floors today not only comes within our budget, but the saving we have effected has made it possible to carry on other work which we previously had neither the time or the funds to accomplish.

Never at any time in the history of the world was there a more opportune moment for safety men and women (building managers and owners, supervisors and superintendents), to concentrate on eliminating this slip and fall type accident. It is easier to prevent than most others. One sure way to prevent it is to insist on all of your floor-cleaning agents being non-skid when you buy them.

Today's world calls for production on a higher level. Industry will meet that challenge. Our hospitals are working at capacity load, and the task they are committed to in case of an atomic attack will triple their patient load without giving them time to lick their own wounds. Preventing unnecessary accidents is a patriotic duty.

From an address presented at the 21st Annual Greater New York Safety Convention.

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Waterproofing of Floors To Prevent Damage

WATERPROOFING of floors is an important feature of building construction as a means of decreasing the loss due to water in case of fire or other emergencies. In many building fires a considerable portion of the total loss results from leakage of water through floors or from lack of floor drainage to prevent accumulation of water on floors. This occurs in buildings of fireproof or fire-resistive construction as well as in other types of buildings. Correction of this condition can be brought about by waterproofing of floors and providing for floor drainage, according to a recent bulletin of the National Board of Fire Underwriters.

For ordinary wooden floors, waterproofing can be provided by one inch or more of a mixture of sand, pea stone and fluxed asphalt applied hot, or a ½-inch coating of cement, sand, emulsified asphalt and pea stone can be applied cold on top of an asphalt-coated waterproofing fabric laid in a heavy priming coat of asphalt. Another form of waterproofing can be provided by five plies of waterproofing membrane, mopped with asphalt, and covered with a wearing surface of wood block, matched planks or concrete. Where the base is comparatively rigid, a waterproofing, ½ to ¾ inch thick, of marble chips, magnesium oxide and magnesium chloride, laid over a base of expanded metal, will give good service. For light service, especially on fireproof floors, linoleum, rubber tile or asphalt tile laid over a waterproofing fabric laid in a heavy priming coat of asphalt, will be dependable.

In new fireproof construction waterproofing can be obtained by a fine cement, granolithic surfacing.

In all cases particular care must be

WHAT'S NEW?
See pages 70-72

taken not to puncture the waterproofing by nails and to carry up the waterproofing for a distance of 4 inches around all pipe or floor openings and at side walls and partitions which go through the waterproofing.

Water Removal

Scuppers, which are devices to permit water to flow off the floor to the outside of the building, are of two general types. One is for exterior wall installation and consists of a cast-iron or fabricated steel box, which is placed in the wall at the floor and extends through the wall. It has a flared opening on the inside. A hinged flap on the exterior is normally closed, to stop any draft; but will open to allow the water to flow to the outside. Another type is set flush in the floors and connects to a down-pipe extending through the interior of the building to a sump or drain.

The number of scuppers will depend upon the area of the room or floor. The general rule is one scupper for each 500 square feet of floor area.

Goods kept on tables in stores and factories are often covered each night as protection against dirt. For those articles which are very susceptible to water damage these covers might well be of waterproof material, such as lightweight rubber blankets, plastic covers or specially treated duck. Better work with salvage covers at time of fire and less damage by water will be obtained if shelves are kept a few inches away from walls and partitions.

Where basements are used for storage, the pitching of floor to a sump, and the installation of a pump of good capacity will be very beneficial. In this connection every fire department should have a record of the various contractors and others who have ditch pumps or other equipment which can be used to pump out basements.

In sprinklered buildings a very large percentage of fires which cause sprinklers to operate are either extinguished or brought under control by the sprinklers. Water damage in such cases is often more than actual fire damage, but the total damage is almost always much less than would have occurred if the building had not been sprinklered and the fire fought with hose streams. Water damage from sprinklers can be greatly reduced by waterproofing of floors and floor drainage, also by installation of water flow alarm service to provide immediate notification of sprinkler system operation. Such water flow alarms are often arranged to be transmitted to the local fire department.

Supplementing water flow alarm service in sprinklered buildings and of great value in all other buildings is the use of skids on which baled goods, paper and other heavy bulky material should be placed. These usually are made in such manner as to keep the material six inches above the floor. Where material is kept under counters, in drawers and in cabinets these should be so made and arranged that the bottom six inches cannot be used for storage.

4 REASONS WHY

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TRANSPORTATION

Vehicle Maintenance Study

THE Second Annual Motor Vehicle Maintenance Short Course will be held on the Purdue University Campus on January 7 to 11, 1952.

Requests for information should be directed to Merle M. McClure, Coordinator of Adult Education, Technical Extension Division, Purdue University, Lafayette, Indiana.

Poor Sports on the Road

WHY do Americans exhibit super sportsmanship in the field of sport and practically no sportsmanship in traffic? That question was asked by Lieut. Cdr. Helen Hull Jacobs, U. S. Navy, former international tennis champion, at the opening session of the National Safety Congress this fall.

"The unavoidable hazards of driving these days make the safety problem tough enough," Miss Jacobs said, "without the added problem of coping with drivers who think it's smart to be stupid and who regard sportsmanship on the road as a virtue to be practiced only when they spot the police officer in the rear-view mirror."

She recounted instances in which tennis players lost a championship because they refused to take advantage of an opponent or violate the rules of fair play.

"Doesn't it seem incredible," she said, "that the same sort of people who concede points not rightfully theirs on the sporting field frequently forget sportsmanship when they are driving a car? We Americans have always prided ourselves on our sportsmanship, which is just good manners and consideration for the other fellow."

Miss Jacobs pointed out the close alliance between accident prevention and the national defense program.

"When our government is calling upon every able-bodied person in the United States to take his place in whatever capacity he can best serve his country," she said, "it is sickening to read the toll of lives and maimings that is the result of highway accidents, so many of which were undoubtedly avoidable."

Miss Jacobs urged safety leaders to redouble their efforts in accident prevention, even though results often are discouraging.

"No one has ever won a championship without years of hard practice, heart-breaking disappointments and such a profound determination to reach the goal he has set for himself that there can be no obstacle too great to overcome," she said. "The same is true in the safety field. Hard work, enthusiasm, determination and above all an indomitable wil' to win can make each of you a champion to the men and women and their families to whose safety and well-being you have dedicated your services."

Recognition for Safety and Service

PERMANENT possession of the Trailmobile Trophy, which is awarded annually by the American Trucking Association for safety and service on the highways, was won by Pacific Intermountain Express, Inc., of Oakland, Calif., at the annual convention of the ATA in Chicago.

By winning the Trailmobile Trophy three times in succession, PIE became its permanent owner, according to G. D. Sontheimer, ATA director of safety.

The Trailmobile Trophy is awarded for (1) preparation for safety on the highways; (2) preparation for service on the highways; and (3) service rendered to highway travelers, according to W. A. Burns, Jr., vice-president and sales manager of Trailmobile Inc., manufacturers of commercial truck-trailers in Cincinnati.

Presentation of the Trailmobile Trophy to C. E. Johnson, vice-president and general manager of Pacific Intermountain Express Inc., was made by Walter Mullady, newly-elected president of the American Trucking Association.

Safety Impossible Without Visibility

ANYWAY you look at it, night traffic is much more dangerous than day traffic and the chief cause is unsafe visibility due to inadequate light.

On a *mileage* basis, the night death rate is three times the day rate in urban areas, two and one-half times in rural and two and four-fifths times nationally.

On the basis of *number of vehicles operating*, the night death rate is four times the day rate.

In other words, the 1950 traffic death toll, instead of 20,000 should have been 5,000 on a mileage basis, and 3,750 on the basis of number of vehicles operating.

Making night visibility safe by providing adequate modern lighting would reduce the night accident toll 6,000 to 10,000 lives per year in the opinion of illuminating engineers.

General view of the outdoor bus parking area at San Antonio Transit Company's new terminal. In the center are the six 5000-gallon propane tanks for storage of the liquefied petroleum gas used for fueling the more than 300 buses serviced here.

Safeguards for Propane-Bus Terminal

The new storage and maintenance facilities for a fleet of propane-fueled buses are equipped to minimize the hazards of fire and explosion.

USE of propane as a fuel for motor buses has created new problems in storing and handling this highly volatile compound which is a gas in normal atmosphere and a liquid under pressure. The successful and increasing utilization of LP gas for household fuels has demonstrated that it is no more dangerous than any other gas. However, storing the large quantities required for fueling buses and the frequent handling of the propane do pose a different problem.

In recognition of this, the San Antonio Transit Company, San Antonio, Texas, recently built new storage and maintenance facilities for its fleet of propane-fueled buses. These facilities are designed for maximum safety to minimize fire and explosion hazards.

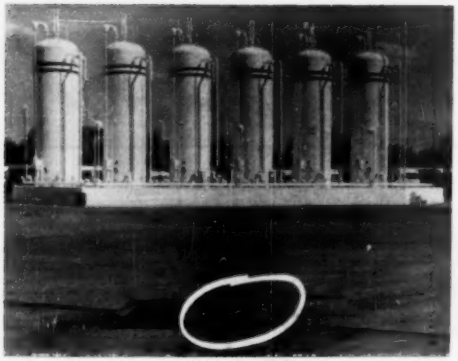
The transit company called in the Hudson Engineering Company, Houston, Texas, to assist in designing the new plant. The Fire Prevention and Engineering Bureau of Texas and the Health and Safety Division of the U. S. Bureau of Mines, participated as consultants. As a result of the combined efforts of the owners, designers and consultants, the bus company's new storage and maintenance facilities are described as a "model" for this type of operation.

Warning Systems

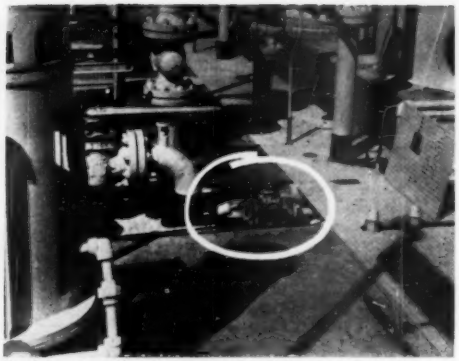
One of the chief problems concerned a method for accurately detecting and reliably warning of combustible concentrations of propane in the atmosphere around storage tanks, piping, valves, fueling station, and repair pits. This problem was solved by the installation of multi-point combustible gas alarm systems. Two separate systems are used—one to protect the outdoor storage and loading and unloading facilities and the other to serve the repair zone inside the modern steel and glass maintenance building which has a floor area of some 45,000 sq. ft.

These two combustible gas alarm systems continuously sample the atmosphere from eight different locations, analyze the samples and instantly warn when the gas-air mixture reaches 40 percent of the lower explosive limit. This enables personnel at the terminal to take remedial action immediately.

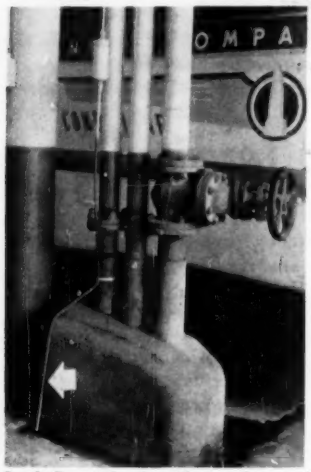
Four sampling lines run to each alarm panel. The system that protects the storage unloading area, and fueling rack has one line running 240 ft. from the instrument to the six 5000-gallon propane storage tanks. Tanks, valves and piping are inside a two and one-half foot high concrete fire wall. Another sampling head is located in the covered trench that contains fuel lines from the storage tanks and the fueling rack. This line is arranged to detect any leaks in the transmission piping. There is another line drawing samples from the propane unloading



Designed for maximum safety, the terminal's propane storage tanks are surrounded by a reinforced concrete wall serving as a dike and a buffer. Circled in the foreground is one of the air sampling intakes which was lifted from the trench for photo.



To detect immediately any propane leaks in piping, pumps or valves at the storage tanks, one air sampling intake is located there in a trench, as shown circled in the photo. Propane gas is heavier than air and sampling points are located in low spots.



Bus fueling station is outdoors and covered by a canopy. The line which samples the surrounding atmosphere continuously for propane concentrations is shown (arrow) extending down pipe column to floor level. Each sampling line has a mechanical filter to remove dust from the air. The fueling dock is protected by a water-fog sprinkler system.

dock about 75 ft. from the instrument panel. The fourth line serves the bus-filling station.

Early Warning

About 300 ft. west of the filling station, which is an outdoor canopy-covered area, is the service building and warehouse. The second four-point gas alarm samples air from repair pits in this building. It was explained that some propane might conceivably escape through leaks in carburetor lines or fittings, and pressure relief valves on the tanks. Fuel in tanks filled outdoors on a cold day might be liberated through pressure relief valves if the buses are moved inside and warmed up. Temperature rise causes the propane gas to expand. Because propane is so volatile and the fuel systems are under pressure, contamination of the atmosphere would occur faster than with fuels of lower volatility. For this reason, the automatic alarm system is designed to provide a warning long before the air becomes dangerously contaminated.

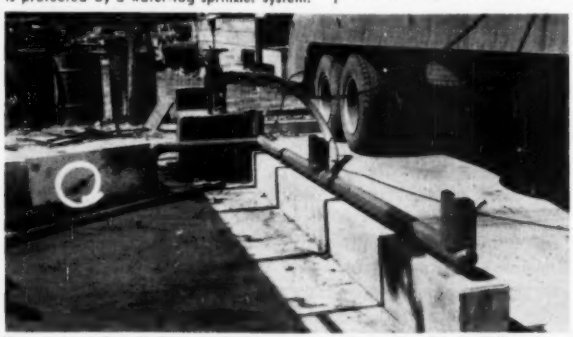
In cities where the weather is cold during the winter months, the need for a positive, instantaneous gas detection and alarm system is even greater than in warmer climates, because of the gas expansion problem.

Extinguishing System

The outdoor filling station at San Antonio is equipped with a water fog system that is manually operated from points close to the fueling rack. Water fog systems also are provided for the unloading dock and storage tanks. The terminal itself covers several acres. The area is uncrowded, a situation which is conducive to good housekeeping and an essential part of any well-balanced safety program. Buses are stored in the open.

The combustible gas alarm systems, which can be adapted for use with nearly all known combustible gases, are explosion-proof so they can be mounted in the hazardous area.

In operation, air samples are drawn into the instrument and passed over one of two heated sensitized platinum filaments which form a balanced electrical circuit. One filament, known as a compensator, is sealed in a cell containing uncontaminated air. Any combustibles present in the air sample are burned on contact with the other filament, known as the detector. This raises its temperature and its electrical re-



Transport truck unloading station is protected by water fog sprinkler shown mounted on the reinforced concrete buffer in foreground. At the left may be seen one of the air sampling tubes for the combustible gas alarm. The mechanical filter of the tube is circled. Trucks are grounded to dissipate static sparks.

sistance, unbalancing the circuit.

The degree to which this circuit is unbalanced is directly proportionate to the concentration of combustibles in the sample. This difference is measured by an indicating contact-making meter, which is designed so that when the needle reaches a predetermined point, a magnetic contact is closed to energize the alarm signal circuit. At the San Antonio installation, the alarm consists of a red light flash on the instrument panel, and a horn sounding. The instrument also can be arranged to automatically operate ventilation systems or to actuate any other mechanical equipment, including sprinklers.

Air samples are constantly drawn through the lines to the instrument by means of a turbo compressor. Indicator lights on the panel of the instrument show from which area the contaminated sample was taken.

Throughout the entire bus terminal, every other precaution is taken to safeguard against fires and explosions. All electrical equipment is explosion-proof and installed in accordance with Article 500 of the National Electric Code, regulations of the State of Texas and recommendations of the National Board of Fire Underwriters. The color identification code of the American Standards Association also is followed.

Pictures by courtesy of Mine Safety Appliances Co.

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Industrial Defense

(From page 11) is a tricky one. It should be kept in mind that the distribution of bombs dropped always follows a random pattern. There may be some one point at which the enemy will be aiming, but the landing of the bombs on any given target will have a scattered pattern. If you consider your industrial plant a target, therefore, it makes no sense to take the target as a center and draw a circle of expected damage from the center. The center, of course, is one of the possible places where a bomb might land but you have to consider the effect of the bomb landing at almost any other point or at a number of points anywhere within a number of miles of the plant.

Extent of Damage Likely

From the Hiroshima A-bomb, certain deductions can be drawn as to the physical damage to be expected. Directly under the center over which the bomb bursts, there is an area of substantially complete destruction. This destruction becomes partial a mile or so from the center, and becomes less and less until the only damage is broken glass. In calculating chances of bomb damage on a purely mathematical basis, the plant is much more likely to be in the area where damage will be partial than in the areas of complete destruction. This fact will have some important effects on your decisions as to what measures your plant might under-

take in the way of defense.

Plant Layout and Location

In the light of the probabilities, if your plant is located outside of a metropolitan area the chances of its being a specific target to A-bomb attack are fairly remote. No matter where you are located, the chances of a bomb dropped a long way off its target is always a threat, but this is a very low order of probability and does not justify important deviations from regular industrial practices. In most of the metropolitan areas, particularly in the northern and eastern parts of the United States, any industrial plant is likely to be subject to all of the effects if an A-bomb attack is made on that particular metropolitan area.

If your plant is located in a metropolitan area, it would be only prudent when considering additions to the plant to plan those additions so as to reduce the possibility of fire spreading from one building to another. In other words, build new buildings, if possible, a few hundred feet from existing buildings. Also, if you are now located in a metropolitan area and the question of relocating a plant comes up in the normal course of your operations, it would be proper to choose a new plant location which is definitely outside of a target area.

There is nothing radical or alarming about these recommendations. They are simply ones which prudence and common sense would dictate. They represent official recommendations as found in the brochure issued in 1948 by the National Security Resources Board entitled, "National Security Factors in Industrial Location."

Possible Damage to Buildings

If you want to try to figure out what might happen to the present buildings in your plant, you will find considerable information in the accounts of the fires of World War II. The National Fire Protection Association has a book entitled, "Fire and the Air War," in which the lessons of the war fires of World War II are summarized and which also contains the official account of the atomic bombs on Hiroshima and Nagasaki. This book is perhaps more conveniently available to most people than the numerous official reports which catalog the war damage. There are also two publications available from the Superintendent of Documents, one entitled, "The Effects of Atomic Weapons," which can be obtained for $1.25, and another, "Fire Effects of Bombing Attacks," which can be obtained for 15 cents. For these, write to the U. S. Superintendent of Documents, Washington, D. C.

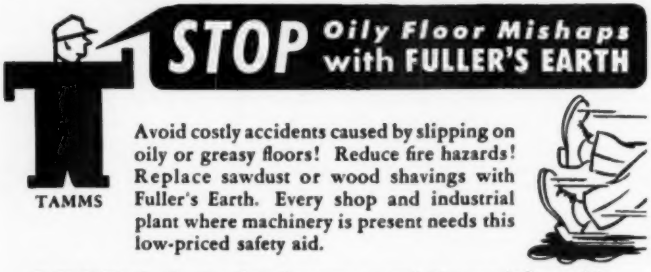
What these various publications say with respect to damage to buildings is that wood buildings are destroyed both by the blast effects and fire effects of an A-bomb. If buildings have brick walls but are otherwise of wood construction, these buildings too are subject to practically complete destruction. The conventional industrial building consists of an unprotected steel frame, a fairly light type of construction with large areas which require beams of considerable span. The A-bomb caused the roofs of such buildings to collapse and such buildings were particularly vulnerable to fire damage if the decks of the steel frame roofs were of wood planks.

It is clear, therefore, that you can count on some destruction to ordinary wood buildings, brick buildings, and of industrial buildings of the noncombustible steel frame type. This destruction is likely to be complete directly under the impact of an A-bomb and it would be considerable at fairly long distances away from the center of the A-bomb impact.

Buildings of fire-resistive construction, either of re-enforced concrete or where the steel frame is protected by considerable fireproofing, will stand up much better both to blast and fire effects. What this means is that superior construction will tend to reduce the extent of damage in any industrial property.

Automatic Sprinkler Protection

In planning fire defense with war situations in mind, the industrial executive is likely to ask what modifications of existing practice he should consider. Since his plant is likely to be in an area only partially damaged rather than one of total destruction, it would be prudent to do all of the things for wartime protection that he would do in peacetime. For example, all new buildings should be equipped with automatic sprinklers with a primary water supply from a gravity tank. Secondary supplies should preferably be tanks from which the water can be taken with a fire pump. If a plant does not now have a large amount of water in ground storage at the plant, the provision of such locally-stored water for fire protection would be an excellent measure to undertake as a matter of wartime defense. Supplies from public water systems are a doubtful quantity. One of the important lessons of the last war was that fires were fought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principally with water that was actually stored at the property on fire. It was not possible for fire department crews to relay water very long distances through hose lines if the regular water mains were broken.

It is possible that a gravity tank might be blown down by bomb blast. But again since the plant is likely to be at some distance from the actual center of impact of the bomb, the chances are extremely good that a gravity tank will not be any more readily blown over than will the buildings of the plant itself. As a matter of fact, standard gravity tanks and towers are built to resist wind loads of hurricane proportions. In earthquake areas they are even designed to carry additional horizontal wind loads or they have other features built into them which make these tanks and towers surprisingly resistant to blast forces.

Plant Defense Organization

Many companies engaged even in hazardous operations have enjoyed immunity from serious fires for long periods of time. This is not just luck but is the result of effectively organizing employees for fire safety. Such organizations are a necessity in wartime.

It is the plant manager's responsibility to assign a plant fire protection officer and set up an organization appropriate to the needs of the plant. In a small shop, the manager looks after this operation himself. He is his own fire protection officer. His fire organization may consist of his master mechanic by day and his watchman by night. This is often sufficient, particularly if the plant is sprinklered and there is standard central station supervision of the sprinkler system and the watchman.

In the larger plant, the fire protection officer may be the fire chief or he may have a fire chief under him. In general, the duties of a plant fire protection man would be to: (a) select, instruct, and supervise the fire watchman, (b) arrange a suitable routine for the maintenance of plant fire protection, including periodic inspections, (c) organize a plant fire brigade according to the needs of the plant, (d) train and drill members of the fire brigade, and (e) work out fire fighting plans in cooperation with department heads within the plant and with the public fire department, if any.

In wartime there are two services, additional to the above, which must be considered. Both of these exist in some plants in peacetime but in wartime they assume special importance.

The first of these is an organization of first aid fire fighters. These fire fighters would not necessarily be members of a plant-wide fire brigade. They would be employees who report to their own department managers and they would, for the most part, be available to fight small fires and perform other functions within their respective departments

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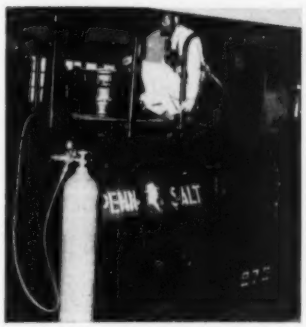

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or tenant areas. The wartime name for such personnel was fire guards to distinguish them from the members of plant fire brigades or members of public fire departments. The fire guards, however, should be set up so that they can take care of small fires within their own sphere of action in their own particular department of a plant, or their particular area in a building in which they are tenants. In England during the war, such fire guards repeatedly saved important properties at times when the regular fire fighting forces were busy elsewhere.

In certain industrial plants such as those of the clothing industry where there are individual rooms in which a large number of people are working, exit drills familiarize the people with prompt evacuation of the premises. A scheme of evacuation, which might be undertaken during wartime, will require a warden service. The warden service appropriate in an industrial plant is substantially the same sort of organization as would be set up to handle an exit drill scheme.

It is obvious that the warden service must be separate from the fire guard service, because the personnel assigned to warden duty (having to do with the evacuation of employees) cannot at the same time be fighting small fires as fire guards. The best scheme may be to set up at least three organizations within the plant: (a) the fire protection officer or fire chief, who has charge of the fire brigade, general maintenance and fire inspection, (b) the fire guard service and (c) a warden service for making exit arrangements. The fire chief can be made responsible for the fire guard service in some plants, but as a rule the warden service and fire guard service would follow the departmental organization of the plant.

For a further discussion of plant organization see a 25-cent pamphlet published by the National Fire Protection Association, "Employee Organization for Fire Safety." There is also available from NFPA "The Industrial Fire Brigade Training Manual," 200 pages, $1.50.

Bomb Shelters

There are some special problems which might be worth brief treatment. In a lot of plants they are wondering if they should build bomb shelters. This matter was discussed at a recent meeting of the NFPA Committee on Civil Fire Defense and the conclusion reached was that bomb shelters should not be recommended until the possibility of attack on any individual plant had been much more clearly defined than is possible at present. There are certain areas of buildings which are safer than others and each plant should study the construction of its buildings to see where those safest areas are. These might be tagged as possible locations for refuge in case any warning of an attack is obtained. It was pointed out, for example, that the central corridors of fire-resistive buildings are often one of the safest locations available.

The NFPA Committee on Civil Fire Defense has also pointed out that ill considered activity, such as interruption of utility services when there is an air warning, should be discouraged. Frequent alerts could cause great confusion and interruption of normal activity if measures were to involve elaborate shutting off of utility services and shutting down hazardous processes, conveyors or assembly lines. The complications of restoring such services and operations are often considerable and might introduce a greater fire hazard than they would prevent. As a practical matter, shutdowns would be likely to extend confusion over a far greater area than any which would be actually damaged, thus increasing the effects which an enemy could cause by an attack; also, by threatened attacks, an enemy could cause frequent interference with normal activity and affect industrial production in cases where an actual attack was not made or was beaten off.

It would be prudent for executives to examine their plant, taking stock of features which would make severe fire damage possible and taking steps to eliminate, modify or protect such features. In general, fire safety can be improved if combustible building construction is replaced, if quick-burning materials or materials which could cause severe fires are isolated and if strong water supplies are provided for fire fighting. The situation in each plant should be studied and a scheme to obtain the greatest safety with the least interruption of production worked out.

Protection of Records

Many plants are asking what their policy should be with respect to the protection of records. A part of any exit drill plan, of course, should include the placing of important records in safes, vaults, and protective record containers. Good safes and vaults are likely to give a very high measure of protection against fires which follow an A-

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bomb attack.

The threat of the loss of records will prompt some plants to re-examine their records in the light of their actual worth. Such a classification of records is the first step in a wartime protection program for records.

In deciding where to put records, don't centralize all records. Wherever possible, keep duplicates at two or three separate locations. It is not necessary to send records a thousand miles away but it would be well to have storage points at least 30 to 50 miles apart. There is further information on the whole problem of record protection in the consolidated reports of the NFPA Committee on the Protection of Records which are available in a 64-page pamphlet for $1.00.

The above are suggestions for protecting an industrial property against A-bomb attack. Practically all of these things would be worth doing in peacetime. Furthermore, they are all things which the experienced and prudent plant executive now does as a matter of course.

From an address at the 55th Annual Meeting of the National Fire Protection Association.

Key to Perfect Safety

TOP safety honor conferred by the Du Pont Company, its Board of Directors' Award, was recently received for the fifth consecutive time by the company's rubber laboratory at Deepwater Point, New Jersey. In the entire 22 years of its operation, the company announced, the laboratory has never had a lost-time injury.

Chief factor in achieving its record, according to a Du Pont safety supervisor, has been the activity of the laboratory's safety committee. This is a committee of four or five employees who each month check the entire laboratory for unsafe practices. Every inch of the building is inspected from attic to cellar and from director's office to janitor's broom closet. All hazards to safety are reported to management, and management conscientiously investigates and enforces the committee's recommendations. To keep fresh eyes looking for trouble, the entire committee, except for one permanent member, is changed each month. Eventually, every employee of the laboratory serves on it.

In addition to spotting specific unsafe practices, the committee has proved to have two important corollary values: Service on the committee creates safety consciousness. And management's firm support of the committee creates an atmosphere in which everyone treats safety as serious business.

These two factors, getting employees to think about safety and to take it seriously, have been more responsible than anything else, the company says, for the laboratory's record operation without serious injury.

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SAFETY MAINTENANCE & PRODUCTION Salutes a Safety Idea for DECEMBER

Plastic Film Aids Mine Ventilation

COAL mines can now improve ventilation, reduce operating costs and forestall crumbling of roof and ribs with a new Vinylite resin-based solution similar to that used to protect military equipment. Sprayed over cloth-covered temporary or permanent shaft stoppings, for example, the solution forms a film which tightly seals the stopping against moisture, gases, and loss of fresh air into the blocked shaft. This film will not mildew or rot and is highly resistant to abrasion, moisture and acids. High tensile strength and elasticity enable the covering to survive air shocks and normal abuse without breaking the seal.

The sealing solution can be sprayed on directly to repair cracked or broken walls or overcasts, or to protect the roof and ribs of haulageways and airways from moisture and air that cause them to crumble. The compound is based on a Vinylite plastic resin developed for protection against strong acids, corrosion, and radioactive contamination in atomic energy laboratories.

Standard pressure spray equipment—tank, gun, hose, and compressor—serve to apply the film along main haulageways without interfering with normal coal mine operation. Workmen can learn in a single day to apply the solution. Both materials and labor costs are economical and the film applications can greatly reduce power waste through air losses as well as maintenance costs due to spalling or disintegration of the roof and ribs in haulageways and airways.

To control air losses in a mine, a normal temporary stopping is first erected across the opening to be blocked off. This consists of a brattice, or wooden frame and cross supports, with cheesecloth or coarse burlap, spread across and secured to the edges. A thin coat of adhesive compound is then sprayed over the edges of the brattice and adjoining roof, ribs, and floor. Next, the Vinylite resin-based material is sprayed over the adhesive and the brattice cloth, where it quickly dries in a tough, durable film. The film prevents any air from escaping down the sealed shaft, and it is flexible and strong enough to survive air shocks and normal abuse.

Permanent Walls

The sprayable solution also answers the problem of sealing permanent stoppings made of tile, brick, cinder, or concrete blocks and masonry. Concrete blocks, for example, are laid up dry and wedged in the usual manner. The edges are then caulked with cheesecloth or used brattice cloth. The entire wall is then sprayed with a slow-drying adhesive compound, and a single thickness of cheesecloth is pressed into the wet compound at several points, covering the blocks and extending onto the roof, ribs, and floor. Adhesive and the resin-based solution are then sprayed in the same manner as for a temporary stopping. The film is so flexible that permanent stoppings sealed in this way do not develop fissures and cracks from ordinary roof and rib pressures.

Cheesecloth prevents the film from sticking to the blocks, and can be stripped off whenever desired. The cement blocks can be taken apart and reassembled in another location, and the same film held against the new stopping and sealed around the edges with a sprayed coat of adhesive and the resin-based solution. Permanent stoppings can thus be reclaimed and re-erected many times.

The adhesive compound and the resin-based solution are sprayed directly on the roof and ribs of haulageways and airways to prevent spalling, and on cracked or broken stoppings and overcasts to repair them. Large holes or breaks are first filled with stuffing such as rags or old brattice cloth.

Picture by courtesy of Bakelite Co.

Safety in High Places

(From page 23) are going to work on it, it must provide strength to carry you and any object you may be lifting. It must give you secure footing during the entire time you are on it. If there is no solid structure against which the ladder can be placed, then a step ladder of adequate height and strength is indicated. Length is important, for the ladder when properly in position should be high enough to enable you to stand on the third rung from

the top on a straight ladder, and the second tread from the top on a step ladder, unless the step ladder is equipped with a platform and side rails.

The kind of surface the ladder is to be used on will indicate to you the type of safety feet it should have. For inside use on floors of concrete, wood, tile or linoleum, cork or rubber suction treads are best. For outside use on firm soils, steel points add a factor of safety. Corrugated metal feet provide not only slipping resistance, but increased bearing surface when the ground is not firm. If the job is new to a worker, he should consult his immediate supervisor regarding the proper ladder to use.

2. Examination

Is the ladder selected in good condition? Here are signs of trouble that one should report at once. Are there any: 1, loose steps or rungs; 2, any steps or rungs cracked, split or broken; 3, any cracked, split or broken uprights or braces; 4, loose nails, screws, bolts or other metal parts?

On step ladders in addition: 1, is the ladder wobbly, indicating distortion or strain of side members; 2, are hinges loose; 3, are spreaders loose or bent; 4, are the steps broken or bent on the hinged spreaders? If the ladder has a platform with guard rails; 5, are these guard rails firmly fixed.

Extension ladders—in addition to the same examination given the single ladder—should be examined at the extension locks: 1, are they loose, broken or missing; 2, will they seat properly when the ladder is extended; 3, is the extension rope sound and unfrayed.

3. Placing

Step ladders can generally be properly placed by a single worker. First, open the ladder wide enough so that the spreader will lock in the fully open position. Two, be sure the ladder rests on a firm and level base. If the base is not level, use only solid material, such as a flat board under the foot that is low. Anchor the block firmly. If it is necessary to set the ladder before a door, lock the door or have someone guard it. If the ladder is in a passage aisle where it cannot be clearly seen, protect it from traffic.

Single ladders should not exceed 30 feet in length. If the base cannot be blocked against a wall during raising, have someone hold the base. The foot of the ladder should be set so that its distance from the wall is one quarter of the distance from the base of the ladder to the support on which it leans. Be sure that the object against which the ladder leans is firm and strong enough to support both the ladder and the user. The ladder feet should be parallel with the top support and on solid footing. If the ladder is likely to shift, lash it securely to fixed top support or have someone

(Continued next page)

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hold the base.

Extension ladders should be raised before extending. The worker holding the lower section should place both hands on the side rails, one higher than the other. He should watch the slide iron on the moving section so that he can move the lower hand below it as it approaches. Then repeat this action with the upper hand. This will prevent pinching of fingers. Ample overlap should be left between extensions. The following scale is practical: length 38 feet, overlap 3 feet; length 38 to 44 feet, overlap 4 feet; length 44 to 55 feet, overlap 5 feet. Extension ladders should not extend over 60 feet.

4. Climbing

Clean mud or grease from shoes first. Face the ladder. Use both hands. Hands should grasp side rails and not rungs. One hand should always be clasping the ladder while the other is moving. If tools cannot be carried so that both hands are free, they should be hoisted with a rope and bucket.

5. Working On

Work facing the ladder. Hold on with one hand or use a safety belt. Reach only as far as you can do so without leaning. If you have to lean, the ladder should be moved. Your footing: stand on third step from the top of a straight ladder—second step from the top of step ladder. Have a place for tools so that they cannot fall when you are not holding them. If your work requires pulling or pushing remember that the force you use is transferred to the ladder. Be sure it will not move.

6. Descending

Be sure no tools are left where they can fall on you or on a fellow worker. Lower them before you start down. Face ladder in descending, use both hands on side rails. Make sure one foot is firm on a rung before the other is moved.

7. Removing

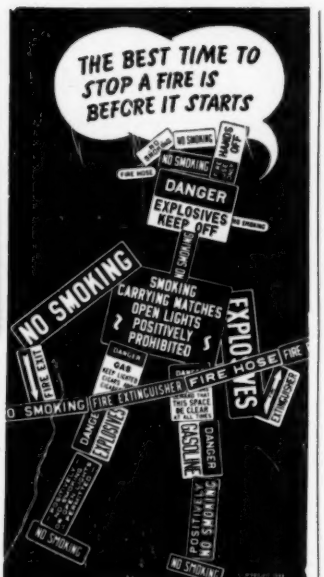
Reverse the process of erection. With extension ladders, lower moving part while ladder is in vertical position. Worker holding the lower part of ladder with hands on side rails must watch for moving slide iron. With base of ladder firmly held or against wall, bring it to a horizontal position. Carry ladders with front elevated. Use special care at corners. If ladder is long or heavy so that two workers must carry it, each should be close to the ends so that the ladder will not project and be dangerous.

Summary

Fixing in mind these seven steps and using them each time work involves a ladder will increase the chance of avoiding serious injury.

1. Select the right ladder for the job.
2. Examine it for defects.
3. Place it properly.
4. Climb it correctly.
5. Work on it skillfully.
6. Descend it wisely.
7. Remove it efficiently.

Picture by courtesy of International Salt Co.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Stonhard to Build

THE Stonhard Co. of Philadelphia will erect a one-story building on the site of the old Phillies Ball Park at the northwest corner of Broad and Huntingdon, according to an anouncement by Benjamin Baldwin, president and general manager. The structure will house the company's offices, warehousing and manufacturing facilities. The firm's products include materials for floor repair and resurfacing, masonry waterproofing and roofing.

Ft. Monmouth Safety Symposium

SAFETY heads in the First Army area and Brig. Gen. Harry Reichelderfer, Fort Monmouth commanding general, spoke at the Fort Monmouth Safety Symposium, attended by division, branch and section chiefs throughout the Signal Corps post.

In his speech to the safety group, General Reichelderfer stressed that the objective of the Fort Monmouth safety program is, "the elimination of all accidents or occurrences resulting in loss of manpower or damage to equipment and other property."

The Fort Monmouth commander pointed out records of the past seven months for "on the job" accidents show that the frequency rate for

Free Bulletins & Catalogs

See page 73

the Post is slightly below that of First Army or the Signal Corps, and that monetary costs which these injuries represent were rather surprising.

"The direct cost of civilian injuries during the seven month period was $9,324 and for military, applying Department of the Army coverage, $53,831, or a total direct cost of $63,155." The general said, "this waste can, and must be eliminated."

Army Vehicle Problems

Continuing, General Reichelderfer talked on the serious problem of motor vehicle accidents.

"At Fort Monmouth and its subposts there are approximately 33 miles of streets and roads, with 13,600 autos government and privately-owned. It is evident that safe operation, as well as parking on the Post, is a serious and complex problem." Quoting figures, General Reichelderfer remarked that during the first seven months of this year there have been 120 military vehicle accidents and many others involving privately-owned cars of personnel assigned or associated with this station.

Concluding his talk General Reichelderfer emphasized that, "commanding officers and chiefs of activities of this command, will be held directly responsible for the effective administration of the Fort Monmouth Safety program within their own sections." He further added that, "it is their personal responsibility to assure that every precaution is taken to prevent on-the-job accidents and that the Post motor vehicle rules are fully understood and complied with."

Other Speakers

Following General Reichelderfer on the podium, Mr. J. G. Aldrich, Post Safety Director, introduced Colonel MacKie, Assistant Chief of Staff, G-1, First Army, and Colonel Chutter, First Army Safety Director. The latter addressed the assembly on supervisory responsibility, using illustrated charts and diagrams dealing with safety.

The second part of the day-long symposium offered speeches by safety representatives of the Post.

During the day, talks were given by Mr. W. C. Crager, an insurance representative, on safety inspections, and a speech on accident investigations by Raymond Kooser, safety engineer of Fort Dix, N. J.

Also, talks were given by Henry Ferguson, safety engineer of First Army, who spoke on motor vehicle accident prevention; accident reporting by Mr. G. P. Bottom, safety director at Raritan Arsenal; and the Fort Monmouth Safety Program by Mr. Aldrich.

The symposium ended with an overall panel discussion with the above-mentioned speakers.

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3. A first prize of $300 will be awarded for the oldest floor machine. In addition, eight consolation prizes of $25 each will be awarded for the eight next oldest floor machines.
4. All entries must be postmarked not later than Nov. 30, 1952. Prizes will be awarded on Dec. 15, 1952.
5. Duplicate prizes will be awarded in case of ties.

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10 Steel Foundries Set Safety Mark

INCREASED emphasis on steel foundry safety practice, highlighted by achievement of perfect safety records by 10 foundries, is disclosed in final results of the 1951 national safety contest announced by Steel Founders' Society of America.

With 135 steel foundries participating on an industrywide basis, a total of 23 steel foundries qualified for awards. Closely trailing the 10 winners of highest honor awards for accident-free operations during the three-month competition were 13 others which maintained near-perfect records, with minimum lost-time accident ratings of 10.0 or less (per 1,000,000 man-hours of exposure) for the period. Among the top 10, all received honor awards last year, and six similarly have scored in the last two years.

Conducted by the Society's Safety Committee under supervision of Charles W. Briggs, technical and research director, the contest was held during June, July and August, months during which precedent indicates accident frequency rates tend to be high. Rules of the American Standards Association were used to determine ratings of individual foundries.

Highest Award winners, listed by contest groupings based on average number of man-hours of exposure per month, were as follows:

Group No. 1—1 to 15,000 man-hours: Malcolm Foundry Company, Inc. of Newark, N. J., Quincy Steel Casting Co., Inc. of North Quincy, Mass., Weatherly Steel Castings Co. of Weatherly, Pa., The Eastern Malleable Iron Co. of Wilmington, Del., Tonawanda Electric Steel Casting Corp. of No. Tonawanda, N. Y., Hughes Tool Co. of Houston, Texas.

Group No. 2—16 to 35,000 man-hours: Deemer Steel Casting Co. of New Castle, Del., Walworth Co. of Greensburg, Pa.

Group No. 3—36 to 65,000 man-hours: Bethlehem Steel Co. of Steelton, Pa., Hanford Foundry Co. of San Bernardino, Cal.

Pittsburgh Steel Foundry Corporation, Glassport, Pa., representing Group No. 4 (66,000 or more man-hours), established a low frequency rate of 3.0, and also was awarded a Highest Honor Safety Award plaque.

All awards were made at the Fall Meeting of the Society at Hot Springs, Virginia.

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Houston Addition for Gustin-Bacon

THE Gustin-Bacon Manufacturing Company of Kansas City, Missouri, announced the opening of a new sales office and warehouse facility in Houston, Texas, recently. The new warehouse will house the Houston Division operations of the company's oil field, industrial, insulation and fire-fighting equipment business.

Gustin-Bacon has maintained offices and small warehouse facilities in the Merchants and Manufacturer's Building since 1934. The new facility is located at 5531 Armour Drive in the Major Industrial Section. Arrangements for better transportation will help the company give better service to their many customers in the growing Southwest.

Mr. Paul Q. Craig has recently been appointed the Houston Division Manager by the company. Mr. H. M. Stone, who has been associated with Gustin-Bacon in Houston for the past seventeen years, remains as Branch Manager.

Visual Aids

(From page 20) to show the saving of an eye through safety glasses, when a drill-press operator was struck by a flying object, consisted of two photographs; the first showed a reenactment of the position of the operator at the time of the accident, and the second showed a prepared display of the broken lens and the flying object.

Safety Posters

Large safety posters, well illuminated, are displayed prominently near the entrances to the reduction plant and the mine. These also are changed at least monthly. Small safety posters are displayed on the bulletin boards previously mentioned.

Accident-record boards 8 by 10 feet are installed in front of the headquarters of each division and each subordinate department. The boards are painted green, are provided with removable, white-painted, metal letters and numerals, and are repainted frequently enough to maintain an attractive appearance. The records on these boards are changed each month. The division board displays the accident record of the entire division and each subordinate department as well as a short safety message or slogan, which

also is changed monthly. The department board displays the accident record of the various crews or shifts in that department.

Miscellaneous

Eye-catching colors that serve as visual reminders are used effectively in the safety program at Morenci.

A standard piping color code is used. Shop machinery also is painted in dimensional colors—light green, buff, and red. Abrupt changes in floor levels, low overhead clearances, and stair risers are painted bright yellow. The locations of fire-fighting equipment are indicated with diagonal white stripes on a red background. The trailing cables that supply power to electrical equipment in the pit also are yellow in color. A service truck used in the pit by the safety department is a brilliant yellow; it is the only vehicle in the pit so colored.

The location of various departments and buildings is indicated by large signs with black, shadowed letters 6 inches high on a white background, which are easily visible 300 feet away.

Reprinted from Bureau of Mines Circular 7598.

Sulfur Fires

BECAUSE sulfur fires now constitute a special hazard as a result of the increased use of that chemical in U. S. industry, the engineering department, fire extinguisher division of the Ansul Chemical Company, Marinette, Wis., has issued a revised technical bulletin covering extinguishment of sulfur fires.

The bulletin points out that the fire hazard has been increased by introduction of new methods of processing raw sulfur which emphasize smaller sized sulfur particles. When in powder form, sulfur requires extreme care in handling because of the violent dust explosions which may result if ignition sources are present.

The bulletin says:

"Sulfur is a pale yellow crystalline solid at room temperatures having a low melting point of 235°F. The ignition temperature is approximately 450°F. with the liberation of a vapor which is explosive when mixed with air in proper proportions. Precautions should be taken also to keep the temperature of liquid sulfur below 405°F. as the danger of vapor explosions increases as the temperature rises above this figure.

"Sulfur in powder form requires extreme care in handling. Conveyors used for unloading should be adequately grounded and thoroughly enclosed. Cleanliness is important around installations using sulfur, so that a minor dust explosion will not dislodge particles from ledges and cause a second more drastic explosion.

Extinguishing Method

"The extinguishment of fires in bulk sulfur storage in buildings should not be attempted with the use of high pressure solid water streams. The force of such streams may raise a cloud of finely divided sulfur which will explode upon contacting fire.

"Dry chemical fire extinguishers can be used effectively for rapid control of a fire in a sulfur pile. To be sure that the fire is extinguished, we recommend the application of water, either by the flooding of the pile with an open hose or by thorough soaking with a low velocity water spray. The sulfur pile should not be disturbed before it is certain that the fire is fully extinguished and that the sulfur has cooled far below its ignition temperature.

"Due to the sulfur dioxide gas formed during the burning of sulfur, care must be exercised in fighting sulfur fires in enclosed places. Approved type gas masks should be available for personnel exposed to this hazard.

"Dry chemical fire extinguishers may be used also to extinguish fires in vats or other containers of liquid sulfur. Water is not recommended for liquid sulfur fires due to the danger of steam explosions which would scatter the burning sulfur."

EXTRAORDINARY ANNOUNCEMENT

64 New Face Shields

We first originated face shields for skiing, iceboating, motorcycling, bob-sledding and other sports. Then we discovered that industry could use the face shield for face protection—and sales sky-rocketed.

Because of the great variety of industrial uses, considerable research was necessary before face shields could be designed to match the actual needs.

Since 1939 we have been steadily designing new shields. With this background of development work, we are now able to announce 64 new shields, each designed to fill an industrial need.

There are nine new styles, a completely new line of face shields, each style with clear and green windows in a wide variety of shapes, widths and lengths. All windows are replaceable and interchangeable and kept in place by a new improved fastener that works easier and holds more securely than the popular glove fastener.

The headgears are revolutionary in design. A special patented double-jointed hinge permits lowering or raising the window by a variation of two inches. What is still more revolutionary is a two-inch forward and backward movement. This permits the wearer to place the window close or far from the face.

Some shields are open at the top, while others have either a single or double cap. The double cap permits the wearer to decide how much of the fore-part of the head is to be covered.

These face shields are priced from $1.25 to $5.35 retail.

Ask Your Dealer to Show You Our New Carton With Illustrations of the New Shields on the Cover

If your dealer has not received a supply of the new face shields, please write us your face protection problems. We will then mail you three different shields for your inspection. Our direct price will include the packing and parcel post costs.

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Brewers Must Plan Safety

THE importance of industry-wide cooperation and uniformity was the theme of the first regional Brewers Safety Conference held at the Schroeder Hotel in Milwaukee. The conference was jointly sponsored by the United States Brewers Foundation, New York City, and the Wisconsin State Brewers Association.

The conference, which attracted 161 delegates from 12 states, was hailed by officials as a highly significant advancement in the brewing industry. The Milwaukee meeting is expected to set a definite pattern for similar meetings to be held in other brewing centers of the United States and Canada.

The program featured discussions by representatives of management and safety directors of various breweries. In emphasizing the importance of continued mutual cooperation between management and employees, James G. Shakman, vice-president Pabst Brewing Company, set up the following suggestions for discharging responsibilities:

1) Make sure before any machinery or equipment is placed in operation, full attention has been given to safety factors.

2) Make equally sure that supervisors and operators are fully informed about the equipment.

3) Plan all processing and operations, plant lay-out and changes, with careful attention to safety.

4) Maintain a system of inspection to uncover curable hazards.

5) Investigate all accidents thoroughly to determine cause and prevent recurrence.

6) Educate workers to follow safe methods.

The panel discussions included safety representatives from nine breweries and each pinpointed a phase of safety technique and procedure used in their respective breweries.

An international flavor was added to the meeting by Frank Jeckell, general manager, Dominion Brewers Association. Jeckell told the delegates that Canadian brewers have "kept pace with pioneering efforts of certain American brewers and have made great strides in safety measures." In addition to Jeckell, many top safety and personnel executives of Canadian breweries were in attendance.

Representatives at the conference also included secretaries from 22 state brewers associations from other brewing centers of the United States. They were present to survey possibilities of similar regional meetings in their respective locales in cooperation with the USBF.

New Name for Ladder Company

LOUISVILLE ALUMINUM LADDERS are being manufactured and sold by the Louisville Ladder Company since November 1, 1951, according to an announcement by Lewis W. Berger, President and General Manager.

Formerly these aluminum ladders and scaffolding products were manufactured and distributed by the Louisville Metal Products Company whose activities will be directed hereafter toward developing additional products of aluminum.

No change in policy or personnel is contemplated and the new company name makes it possible to take advantage of an easily remembered trade styling.

Tokheim Executive Dies

CHESTER C. OBERLY, Chairman of the Board, Tokheim Oil Tank and Pump Company, Fort Wayne, Indiana, died suddenly October 6 in Fort Wayne. He had been board chairman since 1941 and had served Tokheim for 29 years. Born in Buffalo in 1890, Mr. Oberly was educated in Buffalo schools and started his business career in 1904 as an electrical engineering apprentice. In 1919 he joined the Lalley Light Corporation in Detroit and was there until he came to Tokheim in 1922 as a special sales representative in the Denver office. In 1927 he became Eastern Sales Manager of Tokheim and in 1934 he returned to Fort Wayne as Vice President and General Manager. He was also made a director of the company at this time.

Mr. Oberly was named President of Tokheim in April, 1941 and in May, 1941 he also assumed the position of Chairman of the Board. He resigned as President in April, 1946, but continued in the position of board chairman.

Other Activities

A prominent figure in Fort Wayne business life, Mr. Oberly was also active in the Gasoline Pump Manufacturers' Association and the National Association of Manufacturers. He was a member of the American Petroleum Institute, National Industrial Conference Board, Inc., Chamber of Commerce, American Ordnance Association, and the American Newcomen Society.

Throughout his association with Tokheim, Mr. Oberly's influence for the betterment of the company and its employees was widely felt. Company programs instituted under his guidance included a profit sharing retirement Trust Fund; special separation allowances for retiring employees; "Can It Be Done Better" suggestion plan; credit union, health, accident and hospitalization insurance, and club house fund for employees.

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FOR FURTHER INFORMATION
SEE PAGE 22

THE Future SHOWS

Baton Rouge, La.

December 3–4. Annual Louisiana Safety Association Conference. (Louisiana State University) Charles E. Doerler, secretary, P. O. Box 806, Shreveport, La.

Philadelphia, Pa.

January 14–17. The Third Plant Maintenance Show. (Convention Hall.) Clapp & Poliak, Exposition Management, 341 Madison Ave., New York, N. Y.

Milwaukee, Wis.

January 31–February 2. Tenth Annual Mid-Winter Safety & Industrial Nurses Meeting. (Hotel Schroeder.)

Atlanta, Ga.

March 2–4. Thirteenth Annual Southern Safety Conference & Exposition. (Biltmore Hotel) Braxton B. Carr, executive director, 2120 1st Ave. N., Birmingham 3, Ala.

Philadelphia, Pa.

March 4–5. Eighteenth Annual Philadelphia Regional Safety & Fire Conference and Exhibit. (Bellevue-Stratford Hotel) Roy M. Godwin, chairman, Philadelphia Safety Council, 17th & Sansom Sts., Philadelphia 3, Pa.

Boston, Mass.

March 17–18, Thirty-First Annual Massachusetts Safety Conference & Exposition. (Hotel Statler). Edgar F. Copell, Pres., Mass. Safety Council, 31 State St., Boston 9, Mass.

New York, N. Y.

April 1–4. Twenty-Second Annual Greater New York Safety Convention & Exposition. (Hotels Statler and New Yorker). Walter A. Gustafson, general chairman, Greater New York Safety Council, Inc., 60 E. 42nd St., New York 17, N. Y.

Asheville, N. C.

May 4–6. Twenty-second Annual North Carolina Statewide Industrial Safety Conference. (George Banderbilt Hotel) H. S. Baucom, Safety Director, North Carolina Industrial Commission, Raleigh, N. C.

A.S.A. Elects

MR. ROGER E. GAY, Bristol, Conn., president of The Bristol Brass Corporation, has been elected president of the American Standards Association. The announcement was made at the Annual Meeting luncheon of the American Standards Association which closed the three-day Second National Standardization Conference held at the Waldorf-Astoria, in New York.

Mr. Gay is the 10th president of the 33-year-old association, which is a federation of 110 technical societies, trade associations, and 2200 individual company members, working in national industrial, engineering, safety, and consumer standards.

Edward T. Gusheé, vice-president, the Detroit Edison Co., Detroit, was elected vice-president of the association.

Safety Glasses Given to 3300 Otis Workers

MORE than 3300 men in the national field force which installs and services Otis elevators are being equipped with spectacle-type safety goggles at the company's expense, it is reported by W. J. Niederauer, Otis safety director. This newest step in a broad safety program followed a two-year test among 571 construction and service employees in the New York zone. Use of the goggles reduced by 75 per cent the number of reportable eye injuries which, nationally, have accounted for approximately one-fifth of all injuries incurred by the company's construction men while at work.

Employees are asked only to submit their prescriptions, if corrective glasses are required. The accurately ground glasses, clear or tinted as required, have plastic rims and are indistinguishable from standard spectacles, although case-hardened lenses are used. Interestingly, the test program in New York has shown that 32 per cent of these workmen require prescription glasses. The remainder wear similar safety goggles whose lenses have zero refraction.

Fire-Educate the Public

THE National Fire Protection Association recently held its first general meeting in the Pacific Northwest in the form of a two-day regional conference at the new central fire station auditorium of the Portland Fire Department. Speaking at the opening general session, Percy Bugbee, General Manager of the Association, referred in flattering terms to the remarkably effective fire prevention work carried on by the fire departments of Portland, Ore. and Seattle, Wash. The Portland Fire Department, under Chief Grenfell, has recently completed an inspection of every one of the many

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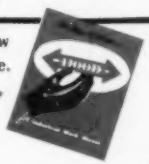

HOOD for NEW Safety PLUS

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thousands of dwellings in that city and the Seattle Fire Department under Chief William Fitzgerald has perfected an inspection procedure known as the "Pre-Fire" planning program which has brought remarkable results in reduced fire losses in that city.

Mr. Bugbee said that the only way that we can expect to halt the present tragic toll of more than 11,000 deaths by fire and property losses of $700,000,000 annually was through the mass education of the general public in the simple measures needed to save life and property from every day outbreaks of fire. He referred to the new comic books issued by the NFPA as one of the most effective methods of reaching not only children but adults with fire prevention propaganda and pointed out that recently the great General Motors Corporation had purchased more than a quarter of a million of these comic books for distribution to their employees throughout the country.

Careless Smoking

Speaking at another session of a two-day regional conference conducted at the Hotel Ambassador in Los Angeles for its members in that area, Mr. Bugbee described forward steps that were now undertaken to educate the public such as the acceptance by the Advertising Council of America of a campaign on home fire prevention sponsored by the NFPA on a year-round basis. "Through this campaign," said Mr. Bugbee, "we can effectively reach all of the people of the country with information about the simple hazards to life and property that are encountered daily as the Advertising Council campaigns reach all of the newspapers, radio stations, television programs, and other means of publicity."

Mr. Bugbee referred to the present interest and support to the campaign that is forthcoming from the major cigarette companies of the country as an important aid in this campaign because of the fact that the careless disposal of matches and cigarettes is the leading cause of fires. He referred enthusiastically to the campaign to save the lives of children in fires initiated by the International Association of Fire Chiefs by former President, John Alderson, Chief of the Los Angeles Fire Department, and under the direction of Jay W. Stevens of the San Francisco office of the National Board of Fire Underwriters.

Mr. Bugbee also referred to the growing interest on the part of the National Education Association, the American National Red Cross, and the Boy Scouts of America in fire prevention education and the importance of this sort of cooperation in the broad campaign.

Extra Benefits of Safety Analyzed

ACCIDENTS alone cost the private electric utility industry $95,000,000 in 1950, and if the industry were released from this burden, nearly $46,000,000 after taxes would be added to net income, H. H. Scaff, Vice President of Ebasco Services, said at the 13th Annual Safety Meeting of Ebasco Client Companies. Speaking on the economics of safety, at the meeting held in Chicago October 8–12th, Mr. Scaff said that on the basis of 1950 figures this amounts to approximately 9% of the industry's common stock disbursements.

"It is of course obviously impossible to prevent all accidents," said Mr. Scaff, "but assuming even a 10% reduction—a fairly modest goal—$4,600,000 would become available for the industry which, if capitalized on a 10½ price earnings ratio, could support some $49,000,000 of additional common stock financing."

Mr. Scaff presented these facts during a session entitled "Safety Is More Than Safety" at which he and other utility executives detailed the many extra benefits of accident prevention.

Public Relations Benefits

R. H. Ashworth, Vice President of the Utah Power & Light Company, addressed the gathering on the public relations aspect of safety. In his talk Mr. Ashworth described specific accidents which his company had experienced, stressing the fact that accidents always hurt the industry by creating ill feeling in the community where the accident occurs and among the friends and family of the injured person. "I am sure," said Mr. Ashworth, "that serious lost-time accidents and, in particular, fatalities have a bad reaction with the public. They seem to deepen the mystery of electric service and indicate, perhaps, that it is dangerous rather than emphasizing the advantages of electric service in the home, on the farm, in the office and in the plant.

"A serious accident is usually played up as front page news and this doesn't help public relations."

Mr. Ashworth said that greater stress on safety methods and safe working conditions would undoubtedly be a great help to the industry's public relations.

Employee Relations Benefits

M. V. Cousins, Director of Personnel, United Gas Corporation, addressed the meeting on the part safety plays in good employee relations. "For a company to have the best employee relations," he said, "it must have a good, acceptable wage and salary schedule, it must have good supervision, it must have good and beneficial welfare programs and they must be well administered. And, to have the best employee relations, a company must have a good safety program.

"When we build a safety program, our aim is to prevent human injury. We want in some way to forestall and prevent an accident or incident or occurrence that would cause physical damage to an employee. This is not to say that the prevention of this injury is not good business, for it is good business and we all know it to be good business; but such efforts go beyond just being good business. They are also humanitarian and their purpose is to protect someone we know and are working with.

"Coupled with the prevention of injury is the alleviation of injury, the minimization of damage and the hastening of recovery.

"These are friendly aims. They are the kinds of things you would do for a friend. Therefore, such efforts should build friendliness into an organization.

"Certainly from the human and humane viewpoint safety is good employee relations."

Production Benefits

In discussing further economic benefits of accident prevention during his portion of the program, Mr. Scaff pointed out the small sums spent on accident prevention. "Generally speaking," he said, "the overall cost of industry's safety program is exceedingly small in comparison with its total accident cost. It has been estimated that the electric utility industry, during 1950, spent only $6,100,000 in safety work or approximately 6.4% of the accident cost for that year.

"To relate economics to safety in operating procedures, a breakdown of all procedures, no matter how simple, to determine the hazards of each step and the means to overcome or remove the hazards will disclose the best way to accomplish production without the danger of damaged equipment and material or damaged personnel. The result will be conservation of time, material, resources and man power. Men who are taught safe methods in their daily work procedures avoid injury to themselves and to their machines, equipment, and materials. This contributes to a feeling of personal security, which is vital to well-being.

"No injuries to employees, no damage to machinery or equipment, no spoilage through accident means greater return on investment—which is the preservation of material resources. Freedom from damaged equipment, from injured employees, from loss of material results in freedom from accidental interruptions to production—which is the means to productive distribution of wealth."

Other sessions on the program of the five-day meeting included speeches by safety leaders in the utilities field.

W. T. Rogers, Safety Consultant, Ebasco Services, Inc., was General Chairman of the meeting.

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Corrosion of Buried Metal Prevented by Electrolysis

THERE will be a minimum of underground corrosion of electrical lead sheathed cable, steel piping and structural steel to interfere with full-time production at U. S. Steel's new Fairless Works at Morrisville, Pa.

To protect these metallic installations, bars of magnesium metal will be tied-in electrically with them and also will be buried adjacent to the big buildings in which steel will be made and shaped for the eastern market. This new cathodic protection was designed especially by the company's research engineers and engineers of the Construction Engineering Bureau after careful measurements, at Morrisville and in U. S. Steel's Research and Development Laboratory, of soil and water samples from the Fairless Works site.

Cable failures, burst pipes and weakened structures cause considerable damage to commercial and industrial installations each year. In an effort to prevent such corrosion losses at the new mill an exhaustive study was made of probable electrolytic action underground and at the foundation level.

It has been found that when dissimilar metals are in electrical contact and are placed in a conductive liquid or moist earth a natural electrical current is generated between the metals and flows from one to the other. This current flows from the metal which by its nature corrodes most to that metal which corrodes least, causing the less stable metal to disintegrate or "decay." This is the principle of electrolysis on which flashlight batteries operate and, in reverse, which makes electroplating possible.

About a hundred years ago Michael Faraday, a British chemist and physicist, discovered that the weight of an element displaced by electrolytic action is directly proportional to the intensity of the current, the length of time the current flows, and the electrochemical equivalent of that element. On the basis of Faraday's Law it was computed that one ampere of current in one year will dissolve 75 pounds of lead. Similar displacement values were computed for the other metals.

Rods of the various metals which will be used in the underpinning and servicing of Fairless Works were inserted in a box of moist soil from Morrisville. These rods were connected to mocroammeters. The dial readings showed that lead and copper generate an initial current of about 50 microamperes, which slowly decreases to a somewhat lower reading, while steel and copper generate a current of about 30 microamperes, which slowly increases to a higher figure. In each case the flow of current through the soil was toward the copper, which acts as a cathode, or electrical positive, with consequent deterioration of the lead and steel, which become anodes, or negatives.

It has been known that if current from an external source could be made to flow in the reverse direction to the copper, lead and steel from a supplementary electrode, corrosion would be prevented.

In testing metals it has been discovered that magnesium is the most effective in setting up a current from itself to the lead, copper and steel. In laboratory terms, magnesium has the greatest "anodic potential." Small magnesium rods inserted in the sample of plant soil and connected to the copper rods reduced the readings of current between the other metals and the copper from as much as 50 microamperes to zero.

As a result of these studies, magnesium bars will be buried to effect cathodic protection of the underground installations at Fairless Works, and all copper and lead will be coated with a neoprene jacket. The rate of deterioration of the magnesium can be calculated by Faraday's Law and by physical and chemical factors present in the earth at Fairless Works. New bars of magnesium will be buried, as needed, to provide permanent, calculable protection against electrolytic corrosion.

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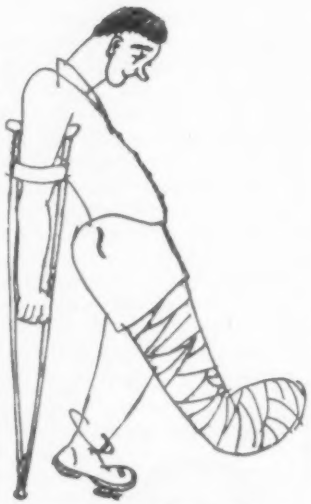
MAN BITES DOG

HERE'S one for the collectors of "Man Bites Dog" stories. The scene of this accidental incident or incidental accident was, according to an Associated Press story, a Naval shipyard. Civilian employees of the shipyard were wearing hard hats in the best safety tradition. The operator of an overhead crane leaned out of his cab to shout at a worker far below. However, his safety chapeau fell off and hit the man on the ground. Result: a broken nose. The AP story didn't say, but we are wondering if the victimized groundling was also wearing a hard hat. Perhaps too one of the newer light-weight plastic hats would be less damaging if this unlikely happening ever occurred again.



LIGHT GUARDS NEEDED

A LOADED dolly in a textile plant accidentally struck a textile drying machine, smashing some pilot lights on the equipment. The resulting electric discharge ignited textile lint that had accumulated along the wiring conduit and the flames quickly spread to other accumulations on beams. Moving upward, the blaze was drawn into ventilators and then ignited more lint-gatherings on the roof. Both the roof and sidewalls of the building were severely damaged before the fire could be extinguished. Guards over the lights would have prevented mechanical injury of the lights, the immediate cause of the fire. A big contributing factor, especially in the spread of the blaze, was the poor housekeeping that permitted lint accumulations.

HOLE IN ROOF OR HEAD?

WHILE working on a roof, a maintenance man placed a piece of tar paper over a flue hole which measured about 13 by 32 inches. Later, when he was carrying a bundle of shingles across the roof, he apparently forgot where the hole was, and stepped on the tar paper, which immediately gave way. He fell through the hole to the floor below, fractured his skull and subsequently died. Openings of this kind should be covered with material that will hold the maximum load applied, or else should be suitably marked and guarded to prevent anyone from walking over the hole.

HARD WAY

DON'T BE TOO SURE

THE impossible may take a little longer but it can happen, as one employee found out to his sorrow. He was a particularly careful workman who always wore his safety goggles if the work he was doing offered the remotest kind of hazard to his eyes. He was engaged in a job where there was absolutely no danger and therefore was not wearing the goggles. He had overlooked, however, a group of nearby workmen who were chipping concrete and were themselves properly protected by face shields and gloves. By unhappy chance a splinter of concrete struck him in the eye. Immediate first aid, followed by treatment by a competent eye doctor prevented any lasting injury. Employees must consider the hazards not only of their own jobs but also of those working in the same vicinity.

SHOD FOR SAFETY

THIS one has a happy ending. An employee was unloading a heavy valve from the rear of a truck. The valve proved to be too heavy, however, and it slipped from the worker's hands to the platform, rolling onto his shoe. Fortunately, the shoes had metal safety toes and the foot was unharmed. But eyebrows are raised over why the man was trying to lift the heavy object alone. A hoist should have been made available for this work, or else the man should have assistance in manual handling.

DANGEROUS TALK

A MECHANIC walked over to talk to a fellow workman who was operating a planer. As they conversed, the mechanic placed his foot on a limit switch which was on the side of the planer. The bed of the planer in traversing caught his foot and pinned it between the stop and the switch. The large toe of the foot was injured. The mechanic has since been warned to remain on his own job and stay away from moving machinery, but he has already learned his lesson the hard way. And how about some safety shoes?

TWO A DAY

FLYING chips can strike twice in the same place, even within a twenty-four hour period. A shipyard chipper and caulker was chipping a weld when a chip struck the left lens of his safety goggles with sufficient force to fracture it. However, the workman received no injury. With the broken lens replaced, the same man was once again engaged in chipping weld when the same accident repeated itself. The left lens was for the second time in twenty-four hours shattered. Thanks to safety goggles, this chipper's eyes have three lives.

industrial Hygiene

ASSOCIATE EDITOR
JACOB A. GOLDBERG, A.M., Ph.D.

Hazards of Synthetic Rubber

THE men who made the American-made rubber industry possible by first making it a safe place in which to work are back on the job today. They are the industrial hygienists who presided at the birth of the man-made rubber industry a decade ago and, again, at its rebirth this year.

"Safeguarding the health of workers in the rapidly expanded man-made rubber industry is again a major responsibility," William E. McCormick, industrial hygienist, The B. F. Goodrich Company, Akron, O., told the Fourth Regional Gulf Coast Industrial Health Conference at Houston, Texas.

"Mass production of chemical rubber depends today, as in the past, on skill in detecting and eliminating health hazards. The behind-the-scenes work of industrial medical men has paid off with the 'miracle industry of World War II' and now is helping to strengthen the nation's defense," the B. F. Goodrich hygienist said.

In discussing industrial health hazards in the manufacture and processing of man-made rubber, McCormick said the industry uses a tremendous variety of different materials, many of them potentially hazardous. It is up to the industrial hygienist to establish standards for their safe use.

"The rubber industry is a rapidly changing, complex and diversified industry," McCormick told conference members. "Its raw material and products come from, and are used by, many parts of the world. It is not only a huge consumer of chemicals, but a large producer as well. New materials, with their unknown hazards, are constantly being developed. Toxicological and industrial hygiene studies for them must be made if they are to be used safely."

Some health hazards exist in the production of all types of American-made rubber, McCormick said. While pointing out that he did not wish to convey an idea of hazardous working conditions existing in the rubber industry, McCormick discussed some of the problems which might arise if precautions are not taken.

Butadiene, McCormick characterized as being highly flammable. Necessary precautions must be taken to prevent the possibility of fire and explosion wherever used; it must be stored and transported under pressure and insulation; it tends spontaneously to form explosive peroxides upon aging unless made with an inhibitor.

Styrene—same precautions against fire must be taken as in the case of butadiene. Workroom atmospheres require ventilation.

Solvents

"From the standpoint of severity of hazard, number of persons exposed and quantity of material used, the solvents are of major importance as a health hazard," McCormick said. In addition to the various systemic problems associated with use of solvents, there is always the problem of dermatitis. This, in many cases, is the more difficult of the two to control.

"Benzol, tuluol and xylol are used extensively as solvents for rubber cements and for tackifying purposes. All are flammable, with quite low explosive levels. Acute poisonings rarely result from these solvents, but chronic poisoning is a real probability. This is characterized chiefly by a damage to the blood forming processes and may be permanently injurious or fatal. The working environment must be so controlled that excessive exposure to any of these solvents will not occur."

McCormick described the physiological action of gasoline (unleaded), hexane, heptane and kerosene solvents as "narcotic." They possess irritant properties to the eyes and respiratory passages.

Health hazard of carbon tetrachloride is severe among the chlorinated hydrocarbons. Serious injury and death may result from exposure. Individual susceptibility varies widely. It produces chronic effects, primarily to the kidneys and liver. McCormick said that

(Continued on page 66)

B R E C K

WATER RESISTANT CREAM

Breck Water Resistant Cream, when applied to the skin, forms a protective film which is resistant to the action of water and water solutions. It spreads easily, leaving a protective film which is not slippery, sticky or "heavy". Breck Water Resistant Cream is recommended for the industrial and professional worker whose skin is frequently in contact with water or water solutions, such as liquid coolants, emulsified cutting oils, mist and spray from alkali baths and plating solutions, flux fumes, cement and lime. An application of Breck Water Resistant Cream is effective for three to four hours.

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Is it dangerous?
What can be done about it?

NOISE has been called the unwanted child of the industrial age. Both have now grown to Bunyansque size. Noise, if anything, has outstripped the size of industry and has become an ever-increasing menace to the health and safety of industrial workers.

Fortunately, however, science and industrial research have come up with a number of discoveries and innovations that tend to lessen employee fatigue and thereby make workers less prone to accidents.

Industry has been making definite efforts to reduce the noise of machinery per se, to eliminate or reduce vibration, and in many instances is taking advantage of sound conditioning, not only in offices, but in the plant itself.

More and more safety engineers and those charged with keeping our industrial giant healthy in these perilous times are heeding the findings of physicians and scientists that noise has definite and deleterious physical and psychological effects on the health, peace of mind, efficiency and safety of workers. These engineers are also realizing that distraction created by noise is an admitted cause of many accidents.

The importance of noise in the industrial picture is attested by the Second National Noise Abatement Conference held in Chicago last October (1951). Its theme was Industrial Noise and eight scientists and others who have studied this problem presented their views on what can be done to reduce noise in industry.

Dr. Howard C. Hardy, supervisor of acoustics and vibration, Armour Research Foundation, Illinois Institute of Technology, told the first National Noise Abatement Symposium in Chicago that the hazard of noise is recognized, that the physical components of this hazard are understood and that attempts are being made to understand its psychological effects better.

Noise Hazards

"It is a recognized principle of safety engineering that any hazard must be abated first at its origin," Mr. Hardy said. "Reduction of noise at its source, therefore, would certainly be a primary method of attack. Since many industrial processes are incompatible with effective noise reduction, a second alternative would seem to be segregation of such operations in such a manner as to expose only the personnel on the job."

Discussing noise and vibration reduction, Mr. Hardy said: "Workers between the ages of twenty-five and forty are more likely to be affected by high noise levels than others. The younger ones, on the average, have better adaption and fatigue less easily. The older workers have become conditioned to their work, and in most cases, have impaired hearing due to advanced age or their job.

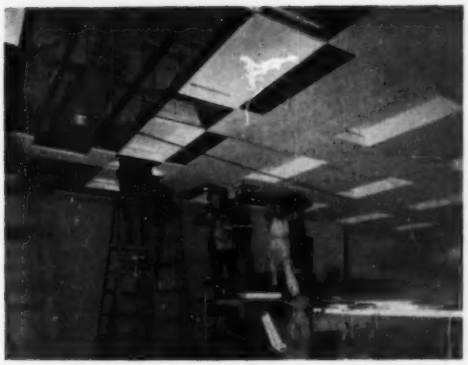
"What are the steps necessary in setting about to obtain noise control? In the first place, proper acoustic engineering should go into the design of a new plant. It may be as important as proper design of the lighting, electrical connections, or the plumbing in raising the efficiency of the plant and providing for the workers' welfare. . . ."

Plant Noise Survey

In a plant already built, Mr. Hardy recommended a survey by acoustical engineers to determine the stature of the noise problem, and then steps to eliminate unwanted sounds, to isolate them and finally to reduce

DECIBELS

By CHARLES J. NOCAR, President
Acoustical Materials Association



Metal perforated panels with an acoustical pad backing are shown above being installed on a suspended ceiling. Lighting panels, recessed in ceiling, are dispersed throughout the area.

them to harmlessness by the use of sound conditioning material.

He observed that "The practical importance of using perforated and other sound absorbing materials on the wall is to reduce the amount of sound energy in the room by having the wall absorb rather than reflect. If only a little energy is absorbed at the wall, the sound reverberates, is loud, and persists for a long time. However, the properties of a material which causes reduction of intensity by wall absorption of reflected sound have little to do with its effect on transmission of sound through the wall. This point has not been made clear and considerable confusion still exists among building architects and contractors.

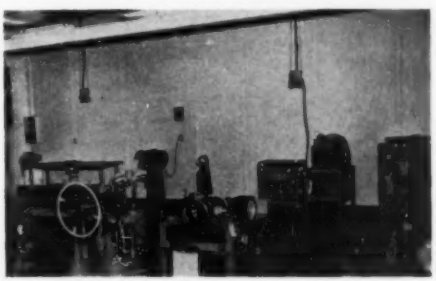
"Sound-absorbing materials can be used in other places than on walls; in fact, one of the best uses is in acoustical panels placed near the noisy sound sources. By strategic location of such panels, the sound can be reduced to one-half or one-fourth its original loudness. Reduction of the reverberation in the room will also cause a considerable improvement of condition, even though the loudness is not changed materially. The reason for this is that psychologically the reduced reverberation allows a worker to 'position' the source. It also makes him able to distinguish easily his own machine in the general background level."

"The major contributions of science to the solution of the (industrial) noise problem," says Paul E. Sabine, Ph.D., noted sound "doctor," "are through the marshalling of data showing that the resulting annoyance is a positive menace to the health and well-being of human beings, the development of means of measuring its physical intensity and the discovery of methods and materials for sound absorption and sound insulation which make the reduction of noise possible."

Dr. Sabine, former head of the Riverbank Sound Laboratories where much of the research into the noise problem has taken place in the last 20 years, says that the threshold of painful sound is 130 decibels. Decibel readings for various types of machines, at a distance of three feet, show the following: various types of punch presses—96 to 103; drop hammers—99 to 101; bumping hammer—100; hydraulic press—130; automatic riveters—95 to 99; the average lathe—80; automatic screw machines—93 to 100; looms—94 to 101; wood planers—98 to 110; wood saw—100.

Plant Noise Abatement

But these readings give only part of the picture. The operator of a punch press, for instance, is not only



Acoustical treatment of the walls is shown in an area where light noisy machinery is in operation. Acoustical treatment of the ceilings in industrial installations sometimes is not sufficient to bring about the desired noise reduction.

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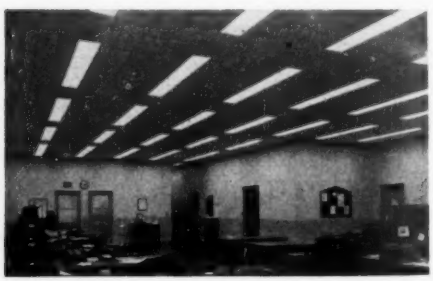
working in a condition where the original noise approaches the intolerable, but he is subjected to a tremendous amount of reflected noise.

The same holds true for other machine operators, while even non-operating personnel are assailed with the over-all primary noise of machinery, plus the almost incalculable total of reflected sound.

This confused noise pattern stems directly from the physical nature of sound. Sound is energy and travels in concentric circles at the rate of 1120 feet per second. When it strikes a hard surface, it bounces, much like a rubber ball, and is reflected to other hard surfaces. This continues many times until its original energy is dissipated. Given hundreds of original sounds per minute, each bouncing around a room, the result is chaotic and unnerving to even hardened employees who erroneously think they are impervious to its effects.

Premature mental fatigue ensues. The menace of costly and even fatal errors of judgment is increased.



Acoustical tile can be installed over almost any kind of old ceiling or wall, either by nailing, cementing, or suspension. It was used here to deaden clatter of office machines, and it may be applied without interrupting the normal routine.

Occupational Deafness

Subjection to such din for prolonged periods tends to impair hearing, and in such places as boiler factories, partial or permanent deafness, with resulting lessening of efficiency, becomes an occupational disease.

"Occupational deafness," Dr. Sabine says, "is the most spectacular and widely recognized type of injury resulting from extreme noise. Less obvious but not less serious is the nervous fatigue which noise induces. Dr. H. B. Perlman points out that in the presence of intermittent noise there is a periodic tension and relaxation of the involuntary musculature by which the fibers of the auditory nerves are protected from very loud sounds, just as the eye is protected from very intense light by contraction of the pupil. The unconscious nervous strain produced is similar to that from a flickering light. Dr. Foster Kennedy found that a sharp loud report increased the intercranial pressure as much as four-fold. He says 'constant noise excites and irritates, it alters conduct, it causes loss of temper and plays a part in quarrels. To overcome the effect of noise, a strain is put on the nervous system leading to neurasthenic and psychasthenic states . . . that the ill effects of noise are not consciously recognized does not alter the fact that they exist as a constant drain on nervous and physical energy'."

Deafness, incidentally, is becoming a compensation problem of serious magnitude, as witness the 1948 report of the New York Workmen's Compensation Board which stated that claims totaling $272,072 were paid out to 202 persons that year to workers who had suffered loss or impairment of their hearing because of their work. Those receiving compensation were engaged in manufacturing, construction, transportation, service industries and retail and wholesale trade.

Each factory, of course, presents its own noise problems, and individual solution is indicated. It is safe to say, however, that part of each solution will be in the installation of some type of sound absorbing material, whether on the ceiling or the walls, and/or isolating particularly noisy machines within or behind acoustically treated walls or fences.

Acoustical Treatment

This brings us to the subject of just what acoustical materials are and how they work.

Sound conditioning in itself does not stop noise; a cough, a typewriter, a dropped tray, a bookkeeping

machine, a ringing telephone bell, a punch press, a band saw or any other noise source generates as much acoustic energy in one location as another.

The loudness is lessened in a sound conditioned room because the original sound dies out faster. It is not sustained by repeated reflections from ceiling to floor and wall to wall as it is in an average room.

All acoustical materials are porous. The sound impulses enter the maze of tiny spaces in the body either through the natural openings on the surface or through mechanical perforations made in the face of the material expressly for the admission of those sound waves.

In penetrating and traveling through this maze, the sound wave encounters just enough resistance to create friction which dissipates the acoustic energy.

In the past few years vast strides have been made and a variety of substances are now used to absorb sound. These include: drilled or fissured tile made from mineral or vegetable fibres or granules, perforated metal, and drilled cement-asbestos sheets. A good acoustical material will absorb up to 70% of a sound and the noise volume in a room can be reduced 40 to 60 per cent.

Selection of the proper sound conditioning materials will depend on the advice of experts which most of the members of the Acoustical Materials Association furnish gratis. While the primary consideration will be the character and intensity of the over-all noise, other factors about the material such as light reflection, partial insulation, moisture resistance where high humidity conditions exist, decorative possibilities, structural strength, and maintenance costs should also be considered.

When we sit back and look over the noise abatement problem we realize that a very important item to both the management and the safety engineer—the COST of unwanted noise—still confronts us.

At first glance, the increase in insurance premium might seem to be the most costly result of over-frequent accidents, but this is not always true. Again the larger figure might be found in decreased worker efficiency in those who witnessed or were otherwise affected by the accident. For proof of this ask your own safety engineer. He will tell you that a serious accident is almost always followed by other minor accidents, and your time study man could easily check on and prove the fact that an accident is always followed by a more or less protracted period of lowered production. Your own safety engineer will also tell you that among the chief contributing factors to all accidents is the nerve fatigue caused by noise.

If all the costs of excess noise were totaled in any factory or plant it would be found that an anti-noise slogan applicable to your factory might be "A Dollar a Noise" and in extreme instances this might be a serious understatement.

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Hazards of Synthetic Rubber

(Continued from page 60)

rigid inspections of the working environment are necessary to maintain atmospheric concentrations at safe levels.

Some substances used in minor quantities present health problems, also. McCormick named dinitrochlorobenzene as a hazardous compound. It may be a severe sensitizer and is also systemically toxic. Elaborate precautions must be taken to prevent skin contact. As an example of changing plant layout to provide adequate health protection, McCormick cited the necessity of installing process ventilation during coagulation of latex, since hydrogen sulfide may be produced.

Company Medics Keep Employees Safe and Well

PREVENTIVE medicine in American industry is making life safer for workers who have contact with toxic chemicals or materials. According to Dr. Rex H. Wilson, medical director of the B. F. Goodrich company, most large companies have augmented their medical divisions with industrial hygiene departments to screen all materials and finished products for toxicity before using or marketing them.

With the increasing use of new chemicals, radioactive isotopes, other nuclear fission products and X-rays in the rubber field, the aim of industrial medical departments is to guide workers in how to handle them safely, not to prohibit industry from using them.

A sound industrial health program plays an important part in establishing good employee relations, Dr. Wilson said, and is a favorite subject of discussion in labor negotiations.

The rubber company's medical director said that the wearing of safety glasses and safety shoes, combined with continuous safety campaigns at all B. F. Goodrich plants, has lowered the company's industrial accident rate. By safeguarding employees and providing a healthy working environment, BFG also has been able to maintain a high level of production.

Dermatitis Among Engravers

SEVERAL cases of dermatitis of the hands and forearms had been reported among the workers who were working on treated glass plates in a negative engraving room of a Government agency. The Division of Industrial Hygiene, PHS, was called in for advice.

As described by Dr. W. F. Edmundson of the Public Health Service's Division of Industrial Hygiene, although sporadic cases were usual, there had been an unusual increase in the number of workers affected in the last 4 months. This number approximates 10 in that period affected by varying degrees of dermatitis from moderate to mild. In general, dermatitis had occurred on the skin areas which would directly contact the treated glass plates when the worker was leaning on the plate in the course of his work.

It was noted that this posture of leaning on the plate was universal among these workers. In order to protect the glass plates from perspiration, various materials were used to lean on. Loosely woven cloth and porous paper mats were used most commonly. These materials would obviously contact the chemicals on the glass which are almost dry but still in a slight sticky state and some of the chemicals would be transferred to the fabric. Since these mats are turned over and over in the course of a day's work and leaned upon, it is probable that skin moisture would extract some of the chemicals from the cloth or paper. Also, there are occasions when the skin directly contacts the treated glass, especially on the side of the hand and fifth finger which is rested on the plate when the worker etches the negative with his instrument.

There were three types of chemically treated glass plates contacted: (1) Glass coated with an emulsion of carbon black, turpentine, and asphaltum; (2) glass coated with a mixture of ammonium bichromate, egg albumen, red, yellow and blue dyes; (3) glass coated with ammonium bichromate, egg albumen, silver nitrate, sodium sulfide and a developer, hydroquinone (Pitman processed).

In the above-treated glass plates, there are two main cutaneous chemical hazards, the ammonium bichromate and hydroquinone. The chromate compound is the more important of the two, but hydroquinone is a known skin irritant also, especially if acted upon by the oxidation action of chromic acid (of which there is a small amount in the ammonium bichromate) to change it to quinone, a more powerful skin irritant.

In order to minimize contact with the glass plates, it is suggested that (1) the protective cream already in use be continued, though it should be understood that its preventive action is not to be relied upon; (2) protective cloths should be used to lean upon, these cloths being impervious and of such material that only one side be used, for example, a blue-colored rubber on one side and a white cotton material on the other; these cloths should be washed frequently; and (3) as an alternative protective device, plastic sleeves would be effective, although these would probably interfere with the exacting work of these employees.

Incidentally, another important cutaneous hazard was noted on a visit to the rooms where the glass plates were sensitized with chromate solution. The men who pour the ammonium bichromate and albumen over the plates with a tin cup which has a spout were not protected from the solution which occasionally drips from the spout, contaminating the hands and forearms of the workers. It is suggested that the men engaged in this operation wear cotton-lined rubber gloves and plastic sleeves. The sleeves would also protect these same men when they fasten down the sensitized plates after whirling them dry. In this operation their forearms contact the chemically treated glass and would again be a source of dermatitis from ammonium bichromate.

THE INDUSTRIAL Nurse

EDITOR

ROSAMOND J. WEBSTER, R.N., A.M., Ph.D.

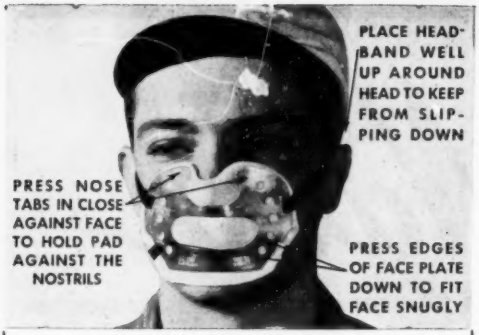
Neuroses in Industrial Workers

IN MANY industrial medical departments the ailing or injured workers are necessarily handled in a clinic atmosphere. There is limited time for treatment; the skilled physicians and nurses can rapidly provide various essential services. Above all, workers are often in a hurry to get back to their jobs presumably because of production schedules, bonus plans, or piece work. Others will delay in as many ways as they can. Because of the very nature of the industrial medical department there is little time for individual attention which is an important factor in the handling of those with neurotic tendencies. Very often it is not possible to pay attention to the inner problems of workers who report for medical or surgical care. Their apprehensions, longings, fixations, quiet feelings and other factors in neuroses remain hidden from industrial physicians and nurses, unless somehow time is available for a true appraisal of their complaints and presumed medical ailments. The etiologic factors that are the basis of the medical department visits must somehow be brought to the attention of the professional personnel.

Yet, according to some who have had experience in this area, such workers are investigated medically only to a limited degree even in instances of persistent medical and physical therapy extending over a comparatively long period of time. It is evident that if that fringe of neurotic patients is to receive adequate and suitable therapy, it is essential that there should be early recognition and appreciation of the specific factors which contribute to the problem of subjective symptomatology. Any lack or meagerness of objective physical findings and disability out of proportion to the findings, or lack of effect of treatment should be recognized early. Subsequently, psychotherapeutic measures seem essential if any real results are to be achieved. This raises an important question as to how best to handle such patients or ailing workers. Industry usually cannot adopt the necessary measures nor provide the facilities. Private physicians, family physicians, local hospital and clinic facilities may have to be used.

The Government and Health Programs

AN ANALYSIS of Federal Government programs and expenditures in the areas of health and social welfare points up some impressive items. Here are a few: (1) The Federal Government assumes responsibility (about $4 billion annually) for many of the medical, educational and welfare needs of the large veteran population which now totals over 18,000,000; (2) the Federal Government sends monthly social security checks to help sustain over 4,000,000 aged retired persons, wives, widows, children and dependent parents; (3) the Federal Government finances over 60 percent of all medical research in the country today; (4) the Federal Government makes grants totaling about 2 billion annually to states and local communities to help finance a variety of health, education and social welfare functions. With the national defense program expanding in various ways and places, many communities are finding it necessary to call upon the Federal Government to provide essential community facilities and services because of the inadequacy of local resources. Congress has approved health appropriations which include the following: general public health work $15,960,000; hospital construction grants $182,500,000; cancer research and control $19,500,000; tuberculosis control $8,745,000; venereal disease control $11,653,000; communicable disease control $5,916,000; medical research institute $15,500,000; mental health activities $10,519,000; heart research and control $10,000,000; dental health activities $1,599,000. It is fully evident that the Federal Government is doing an extensive job with taxpayers' money in service and research. Apparently our appropriating body has been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won over to the concept of prevention of diseases and finding ultimate causes and cures for various diseases. Once these financially expensive projects bring tangible scientific results, the costs will be fully justified.

Industrial Sickness Absenteeism

THIS is an important matter, especially in these times when a shortage of skilled and experienced workers is evident in many industries. The high cost of labor, as well as the high cost of living, are further factors in the program to reduce sickness absenteeism as far as possible. The U. S. Public Health service has maintained a carefully controlled project on studying this subject since 1921. Approximately 200,000 male and female employees have been regularly reported upon. For the year 1950 the rate of absenteeism among males for sickness and non-industrial injuries was 116.8 per 1,000 workers. It should be explained that by the term "rate" is meant sickness and non-industrial injuries disabling for 8 consecutive calendar days or longer. The 1950 rate was 22 percent higher than in 1949. Among females, the 1950 and 1949 rates are approximately the same—258.4 and 254.5. The 1950 rates for influenza and grippe, hernia and cancer are markedly higher, while the rates for tuberculosis of the respiratory system and diseases of the pharynx and tonsils are lower. A comparison of the male and female rates indicates that for 1950 the female rate is two and one fifth times the male rate, and for 1949 the female rate is two and seven tenths times the male rate. A downward trend in male sickness absenteeism, based on illnesses and non-industrial injuries disabling for 8 consecutive days or longer, began in the postwar period. The 1950 rate is somewhat above the rate for 1949 and may possibly be the beginning of an improved service in the years immediately ahead. The increase in frequency was participated in by each of the broad cause groups: respiratory diseases, non-respiratory non-digestive diseases, digestive diseases, and non-industrial injuries. Keeping such figures in individual plants and for individual workers as well can help to throw much light on total production and personal capacity.

Industrial Nursing in Australia

AUSTRALIA is a long way off from the industrial medical scene in the United States. Yet, a bulletin of the Central Board of Health of South Australia carries a series of articles on health maintenance in industry. One of these deals with the nurse in industry, and was written by a nurse-inspector, a certified industrial nurse in London, England. It is interesting to learn that such nurses are certified in that country. She defines industrial nursing as a specialized form of medical, surgical, and public health practice, combining certain elements of medicine, engineering, chemistry, sociology, statistics and the principles of the prevention of disease and health-promotion. The general aim should be to maintain the health of the worker in the factory or other workplace. She must guide and help the worker to a state of positive health. The nurse should do a certain amount of research, keep records and undertake health teachings. The objectives are to increase the physical and mental efficiency of the worker, and better the quality and quantity of production. As outlined by this English industrial nurse, the duties are of two kinds: (1) executive, and (2) advisory. Under executive duties are included the following: responsibility for helping to organize and equip the department for first aid and other treatments; assist in the training of first-aiders and give home nursing lectures; assist the physician at medical examinations of new employees and at periodic examinations of workers exposed to industrial diseases; keep contact with sick employees; promote health education; keep records and submit periodic reports; acquire knowledge of processes in the factory; maintain appropriate outside contacts. There are a number of advisory duties, including factory hygiene, canteen facilities, accident prevention, recreational facilities and service on various plant committees. It is apparent that our English and presumably Australian

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co-workers in industrial nursing are up in front in recognizing their responsibilities and opportunities for service.

Taking Stock

WITH the great expansion in industry caused by defense mobilization, leaders in medicine and related fields are raising questions as to the effectiveness of industrial medical service and safety protection. Unfortunately the great majority of workers today are employed in plants that have little or no medical services except routine pre-employment physical examinations. According to Dr. Howard A. Rusk about 70 to 75 percent of the nation's workers are employed in the 99 percent of the nation's industrial plants that have less than 500 employees. These plants do not, for the most part, employ physicians. Most depend entirely on their insurance companies for medical and surgical care of injured employees and do little about preventive health services.

At present there are only about 2,000 full-time industrial physicians in the country, with 13,100 industrial nurses and 650 industrial hygiene engineers. To meet the increased needs of defense mobilization with its increased industrial activity and larger numbers of women, older-age and disabled workers entering the labor force, the Council on Industrial Medicine of the American Medical Association has estimated that we will need 1,600 more industrial physicians, 5,320 more industrial nurses and 400 more industrial hygiene engineers. It appears that but very few physicians are now undergoing training to fit them for such posts in industry.

There is a distinct challenge to the industrial nursing profession to strive to improve the knowledge and status of these already employed in industry. Further, this challenge extends into the immediate future for presumably many nurses without adequate training for posts in industry will be absorbed into vacancies as they occur. College and university courses, as well as in-service training courses, must be provided in different parts of the country to meet current and future needs. Some areas are already meeting local requirements.

From the A.M.A.

THE sub-committee on Manpower Conservation of the Committee on Industrial Defense, Council on Industrial Health, American Medical Association, has prepared a statement on manpower conservation. Among various items dealt with, the report considers the functions of an adequate industrial health service. The major items include the following: (1) preplacement examinations, (2) periodic health examinations, especially of those exposed to occupational disease hazards and of those who need special follow-up, (3) treatment of all occupational injuries and diseases, (4) reasonable care and advice for non-industrial injuries and illnesses occurring while on the job (For further care, employees should be referred to their own physicians.), (5) adequate records and analyses of the health experience in order to point out future objectives of the medical service, (6) collaboration with management in the provision of a healthful working environment, (7) collaboration in an active safety program, (8) health education for the employees, (9) coordination with community health activities. Obviously the routine annual physical examination of all employees may not be possible due to the shortage of physicians, or the limitation of medical department budgets. In this type of service the physicians' time can be conserved through the help of well-trained industrial nurses or other aids under the general supervision of the industrial physician. Such nurses are, of course, of considerable help in the routine industrial medical service for minor injuries and illnesses. A real job that the nurse in a plant can carry on throughout the year relates to a health education program for the benefit of the plant staff. To do so effectively, she must know the methods of such teaching, the materials available, the community agencies and resources that can be of help. This is a field of service that warrants development.

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THE Washington Glove Corp., of Wisconsin, glove-makers for 39 years, has recently introduced their new product . . . a *reversible plastic-coated glove* so constructed that it can be worn on either hand. Using the slogan "4 Gloves Wear in Every Pair," the makers have developed them for practically every type of industrial use. For glove users with a particular, specific glove problem, Washington Glove Corp. has a testing laboratory to work out a satisfactory solution.

Fully Jumbo-cut, the gloves have a soft, fleecy lining for hand comfort. Strong yet pliable, because of the superior impregnating plastics used, they are claimed to easily outwear leather or rubber gloves, customarily used for industrial work.

Hardly off the production line, this new low-cost item has met with very favorable reception. Available are the Knit Wrist, Short Gauntlet and Full Gauntlet models. For details, send in the coupon.

MAGNESIUM PRESS TONGS

MAGLINE, Inc., manufacturers of magnesium materials handling equipment, announces a new addition to their line of lightweight magnesium safety tongs. The principal feature of the new model is a tapered nose unit designed to facilitate handling of small stock. Weighing only 2½ ounces, the new tongs reduce worker fatigue and aid in keeping press and shear feeding operations at peak efficiency. Manufactured from specially alloyed magnesium, the safety tongs are designed to crush if accidentally caught within the die opening, thus eliminating possibility of damage to costly dies. In addition to their remarkable lightness, the new safety tongs are engineered to give positive rigidity and long service life. Full information and illustrated literature are available by sending in the coupon.

CBM EXTINGUISHER

POSITIVE, one-hand operation is one of the chief characteristics of the new REDI-GRIP Pressurized Portable fire extinguisher now being added to its line by Stop-Fire, Inc., of N. Y. Inspected and approved by Underwriters' Laboratories, Inc., the REDI-GRIP is adapted from an original design now being used by the U. S. Air Force, is available in 1, 2½ and 4 quart sizes and features a combination of charges—CBM (chlorobromomethane) or carbon tetrachloride, individually or in combination, and the expellent may be either air or carbon dioxide.

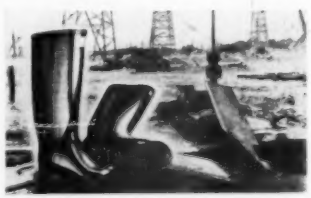
The REDI-GRIP may be released from its bracket and operated with one hand, while a patented safety-lock prevents accidental discharge. This unit has been designed for a wide range of industrial and institutional fire hazards and includes among its features: a removable head readily disassembled for inspection, cleaning or adjustment; non-clogging nozzle, Teflon gaskets; silver soldered joints; flexible siphon tube for maximum discharge at any angle and a drawn brass shell. The range of REDI-GRIP exceeds 30 feet and the discharge time of the 1 quart size is about 27 seconds at 70 deg. F. For close fire fighting this unit provides over 160 deg. of effective extinguishing action from one standing position. For details, use the coupon.

NON-SLIP FLOOR COVERING

A NEW non-slip long-life floor covering, Fera-Mat, designed to prevent serious slipping accidents has been introduced by American Abrasives Metals Company, of New Jersey. The new product provides a non-slip walking surface composed of durable mineral granules which are resin-bonded to a heavy duty weatherproof cloth backing. It is available in cleats measuring 6" x 24", or in rolls measuring 6" wide by 96 ft. long.

Supplied with a protective liner on the underside which is peeled off at the time of installation, the new non-slip floor covering has a pressure sensitive adhesive which makes it adhere firmly to any clean, dry and smooth surface. Being non-rigid, the floor covering permits reasonably heavy loads to pass over it without damage. Maintenance is simple since dirt can be brushed out.

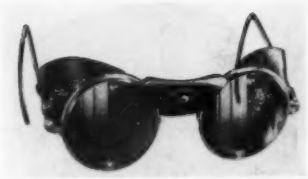
The new non-slip floor covering is recommended for steps, ramps, platforms, factory floors, walkways, cat-walks, washrooms, cafeterias, docks, warehouses, running boards, storerooms, step-ladders, entrances, decks, passageways, exits, production lines, slippery surfaces, aisles, kitchens, storage tanks, fire escapes, flat steel plates, and corridors. For details, use the coupon.



NEOPRENE OILACE BOOT

THE new patented Bar-Flex feature incorporated in the Oilace Boot makes the Bar-Flex Oilace ideal for industrial workers in foundries, oil fields, etc.

Maroon Neoprene uppers resist oil, grease and acids—Bar-Flex outsoles give added support and comfort to lessen foot fatigue plus better traction. This new type of boot is made by Beacon Falls Rubber Footwear, of Connecticut. For details, send in the coupon.



NEW WELDER'S GOGGLE

A NEW welder's goggle, featuring removable and adjustable binder-type leather side shields, is announced by American Optical Company, of Mass. The new goggle can be adjusted for perfect fit and maximum comfort by loosening the endpiece screws. By removing the endpiece screws, side shields can be taken off for cleaning, sterilizing or replacing. The goggle, series 3081A, replaces AO's 3081 welder's goggle, the company states.

The side shields of the new goggle are made of soft leather, providing greater comfort and increased protection against heat, harmful light and flying particles. The cylinder bridge and reinforcing bar are also covered with leather. The company also announces that the side shields are available for its No. 3080 welder's goggle. For details, send in the coupon.

ALL-PURPOSE CLEANING UNIT

JOHNSON'S Wet-Dry Vac, a modern, high-powered vacuum, is the newest aid to efficient and economical building maintenance to be introduced by the makers of Johnson's Wax. The 5/7 H.P. electric motor and collection chamber of the Wet-Dry Vac are enclosed in a sturdy shell of heavy gauge steel. It is finished with a rust-resistant metallic baked enamel that is easy to keep clean. The machine is compact, measuring 28 inches high and 16 inches in diameter. Four hard rubber swivels provide easy mobility and make it possible to move the machine in and out of close quarters.

The new all-purpose vacuum, attractive in design, quickly removes water from any type floor, drawing in all particles of dirt and grime with its strong suction action. Floors dry much more quickly and last longer when scrub solutions and rinse water are removed by a vacuum. It thus saves mopping time and cleans more efficiently.

The new Johnson's Wet-Dry Vac is easily adaptable for a variety of other cleaning jobs. It quickly and thoroughly cleans overhead areas like pipes, beams and other hard-to-reach spots, or sucks up dirt, chips, waste and other debris from the floor.

Each unit comes complete with standard tools and attachments needed for most types of cleaning jobs. Included are a flexible hose, steel cleaning wand, large floor cleaning tool, rubber squeegee and a pull-out-proof rubber cord set. Johnson Maintenance Products distributors are now offering the Wet-Dry Vac at a special introductory price with the purchase of Johnson's new floor cleaner, Emerel. For details, use the coupon.

NEW DUST RESPIRATOR

NEW Compact Comfo Respirator developed by Mine Safety Appliances Company, provides protection for workers in all industries where toxic or fibrosis-producing dusts are hazards. The redesigned respirator, which has been approved by the U. S. Bureau of Mines, features a new type mineral wool filter which requires less than half the filter area and offers only half the breathing resistance of previous models with the same dust collecting efficiency.

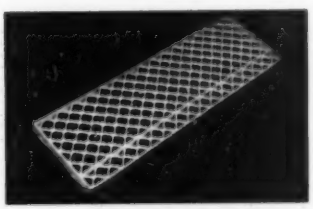
Filter holders of the Compact Comfo Respirator are smaller in diameter and shallower in depth allowing more vision from all angles. The perforated metal filter covers are designed to snap on and off the filter holder enabling speedier changing of filters. A one-piece headband may be worn on the neck or crown of the head depending upon personal preference.

Maximum comfort also is provided by the cushion type facepiece which is soft and pliable and assures a gastight seal for a wide range of facial contours. The new filters, made of extra-fine fibers, are reported to be effective as dust collectors under any type of atmospheric condition. Further information on the new respirator is available by sending in the coupon.

64 NEW FACE SHIELDS

SINCE 1939 Sellstrom engineers have been at work on the problem of designing face shields according to the actual needs of industry, bringing out new shields from time to time, and culminating in the present announcement of 64 new face shields.

Actually there are nine new different basic designs, each with a variety of clear and green windows in different shapes and sizes. The new shields incorporate a number of features never before offered, according to the Sellstrom Co. The glove fastener has been replaced by a new fastener which is not only more satisfactory but once in place, holds tight to a degree never before possible. A double swivel hinge attached to the headgear permits the wearer to raise or lower the window by two inches and also by a variation of two inches bring the window close to the face or far away. The first quantity shipments were made in early October. The new shields were first displayed at the October Chicago Safety Show and the first advertising announcement appears in this December issue. For further details, see the advertisement and send in the coupon.



FIRM-GRIP GRATING

A NEW non-skid grating and skid mat will prove its superior non-skid quality in all industrial uses where excessive oil, grease, water, and icy conditions make walking and working hazardous. Made by the Bustin Firm Grip Grating Corp., of N. Y., it is especially adaptable for platforms, stair treads, ramps, catwalks, running boards for trucks, skid mats, steps for trucks and trailers, ship ladders, ladder rungs, machine treadles, engine and motor room flooring, etc.

With "Firm-Grip" matting a very light and sturdy assembly is attained, it can be easily formed, and will sustain its amazing non-skid quality at a considerable angle. For details send in the coupon.

PLASTIC-TYPE FLOOR SEAL

HIL-TEX is the trade name of a new penetrating seal recently released by the HILLYARD CHEMICAL COMPANY, of Missouri. Developed after many years of research and field testing through 100 Divisional Field Offices, HIL-TEX fills a long felt need of schools, hospitals, commercial buildings, institutions, and industrial plants throughout the nation. It offers a simplified and economical method of resilient floor care; a safer maintenance product to protect newer types of sensitive floor coverings; and a means of preserving color and beauty through the years.

Suitable for asphalt tile, rubber tile and linoleum, it seals, bridges pores and cracks providing a smooth even surface, preparing a bond between the floor and wax type finish. One coat on asphalt tile, for instance, seals the pores of the floor sufficiently so that only a single application of self-polishing wax is needed to produce a rich full lustre.

Of particular interest to flooring and maintenance men is HIL-TEX's resistance to oils, grease, fats, alcohols, water, soap and a great number of aliphatic hydrocarbons such as gasoline, mineral spirits, paraffin oil. It is not affected by acid or alkaline salts present in certain flooring, ozone in the air, the fading action caused by sunlight. Maintenance men are therefore assured complete safety to the floors under their care. It contains no volatile organic solvents, caustics, acids or other ingredients which will SOFTEN OR INJURE any surface which is not harmed by ordinary water. Can be used, therefore, on all floors of a porous or semi-porous nature, including terrazzo and cement, with the exception of wood. Underwriters' Laboratories have labeled it "anti-slip" with a coefficient of friction over 50% greater than minimum insurance safety requirements. It is non-flammable, economical and easy to apply by mop or a lamb's wool applicator. For details, use the coupon.

WATERLESS HAND CLEANER

A HAND cleaner that is safe, fast and effective for cleaning workers' hands, even where grime and grease are deeply imbedded in the skin, is announced by The Boyer-Campbell Company. An addition to their line of "Skin-Cote" protective creams, the "SKIN-COTE" hand cleaner contains a good solvent, buffered by emollient oils, petrolatum and soothing lanolin to protect the skin. When rubbed on the skin, it changes to a liquid that loosens the dirt, grime, rubber cement, asphalt, paint, etc., from the hands where it can be removed by wiping off with a paper towel or cloth, leaving the hands soft, clean and fresh.

"SKIN-COTE" waterless hand cleaner makes unnecessary the use of solvents and thinners which are not only harmful to the skin but also create fire hazards that are often tragically disastrous. In industry it is effective in the removing of such materials as gasket sealing compounds, rubber cements, paints, resins, grease marks from painted surfaces, carbonaceous dirt encountered by foundry workers, and the soot and carbon deposits with which millwrights and electricians have to contend. For details, use the coupon.

NEW HEAD-REST GOGGLE

A ONE-CUP headrest goggle is the latest addition to a line of safety goggles and eyeshields made by Jackson Products, of Michigan. This new UNIGOGGLE, for gas welding, flame cutting, and brazing, is made of one-piece molded plastic with a large, ventilated inside area; it bears firmly against cheeks and forehead to exclude light and heat rays and may be worn over prescription glasses or safety spectacles.

The lens, made in shades 3 through 6, standard 2 by 4¼" size, is protected by cover glass, and may be easily replaced without use of tools, according to the manufacturer.

Plastic headrest, readily adjusted for size, distributes weight evenly. Telescopic arms with concealed springs allow raising or lowering with one hand in one second. This goggle is also available with elastic headband. For details, use the coupon.

FIRE-RESISTANT WALLBOARD

THE Certain-teed Products Corporation, of Pa., has made its gypsum wallboard with a built-in fire barrier available for the first time nationally. Marketed under the name Firestop Bestwall, the specially constructed gypsum panels, in five-eighth-inch thickness rated one-hour resistant by the Underwriters' Laboratories, Inc., is being produced now in five plants.

The superior fire-resistant properties of the Firestop Bestwall are made possible by the presence of unexpanded vermiculite in the core—it expands under great heat to seal up cracks as they occur in the gypsum and thus holds off the flames. According to the company president, Rawson G. Lizars, this type of interior dry wall and ceiling construction is an added safety factor in industrial, commercial and home building. Firestop Bestwall is sufficient in single-layer applications on wall and ceiling to meet many codes regulating industrial, commercial, multiple-dwelling unit and other construction. Consequently, there is a considerable saving in construction cost, the company said. For details, send in the coupon.

DECEMBER, 1951

To Safety Maintenance & Production

75 Fulton St., New York 38, N. Y.

For prices and complete details of items mentioned in this month's "What's New in Safety Products," check items that interest you and mail coupon.

- ☐ Reversible Coated Gloves
- ☐ Magnesium Press Tongs
- ☐ CBM Extinguisher
- ☐ Non-Slip Floor Covering
- ☐ Neoprene Oilace Boot
- ☐ New Welder's Goggle
- ☐ All-Purpose Cleaning Unit
- ☐ New Dust Respirator
- ☐ 64 New Face Shields
- ☐ Firm-Grip Grating
- ☐ Plastic-Type Floor Seal
- ☐ Waterless Hand Cleaner
- ☐ New Head-Rest Goggle
- ☐ Fire-Resistant Wallboard

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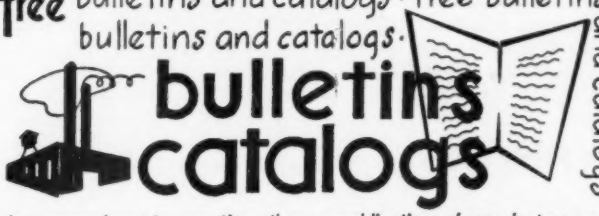

As a convenience to executives, the new publications of manufacturers are offered by the Reader Service Department of SAFETY MAINTENANCE & PRODUCTION. The catalogs, data sheets and technical bulletins reviewed here present the latest information on protective and maintenance products and equipment. Use the Reader's Inquiry Coupon.

MACHINERY MAINTENANCE

Safety Solvents M-201

Fine Organics, Inc. Data sheets give pertinent information on FO 101 and FO 128, two unique solvents with low toxicity and flammability, suitable for cleaning electrical and machinery parts and equipment. The solvents remain stable, will not harm the skin and are corrosion-free.

LIGHTING EQUIPMENT

Guide to Plant Lighting M-202

Benjamin Electric Mfg. Co. This very informative and well illustrated 32-page brochure is a planning guide to better lighting. It shows how planned lighting cuts production costs and then outlines clearly the step-by-step methods of planning and selecting equipment for offices and factories. An excellent chart shows the types of light available and where they should be used.

Light for Plant Safety M-203

Westinghouse Electric Corp. A well illustrated 24-page booklet offers complete plans for outdoor industrial lighting. It stresses four principles that protective lighting for plant security discourages entry attempts, makes detection certain, aids the guard and hinders the intruder, and provides complete reliability. Application suggestions are given, such as lighting of fence boundaries, building faces, water-fronts and industrial thoroughfares. Methods of power distribution, control and mounting are included.

ELECTRICAL MAINTENANCE

Servicing with the Amprobe M-204

Pyramid Instrument Co. The aim of this 16-page manual is to make servicing jobs easier for electricians, maintenance men, engineers, and production and test personnel. It includes case histories of service men showing how use of the Amprobe, a pocket-size voltmeter and ammeter, permits the measuring of currents without disconnecting the wires.

FIRE PROTECTION

15 Types of Fire Protection M-205

Rockwood Sprinkler Co. An unusually informative 12-page folder describes and illustrates 15 different types of sprinkler and extinguishing equipment: wet pipe systems, dry pipe systems, combination systems, deluge systems, water curtains, auxiliary control equipment, sprinkler alarms, fixed water-fog systems, automatic water-fog systems, fixed foam systems, fixed fog-foam systems, fog nozzles, foam nozzles, and wetting agents.

Magnesium Flare Fire Hazards M-206

Ansul Chemical Co. This 1-page technical bulletin discusses the hazards of magnesium flares such as are used by aircraft. The bulletin describes the special dry-powder extinguisher suitable for burning metals of this type and recommends the best techniques for using the extinguisher and controlling the flare fire.

PERSONAL PROTECTION

Safety Shoes for Every Job M-207

Record Industrial Co. Various types of safety shoes are described and illustrated in this 6-page folder. Featured are dress-type oxfords as well as the more traditional high and low work shoes. In addition to the safety box toe, the shoes are available with various types of slip- and oil-resistant soles.

Plastic Saf-I-Duo Goggle M-208

U. S. Safety Service Co. A 1-page illustrated bulletin describes the versatile one-piece-lens goggle which can be used with various types of frames to give the wearer eye protection against impact hazards, dust, fumes, acids, chemicals, liquid splash, etc. The frame may have regular vents, large vents or screen vents and may be of an acid-resistant material.

Lineman's Suits & Accessories M-209

W. Y. Haynes Co. The new 1952 catalog offers the water- and wind-proof suits for linemen, consisting of slip-on jackets, regular or overall style pants, and detachable hoods. An unusual feature is that the clothing may have strips of reflective "Scotchlite" tape to make the wearer more visible at night. The catalog also offers raincoats and carryall bags.

Eye & Face Protection M-210

Michell Mfg. Co. A comprehensive catalog of protective equipment handled by this concern. The illustrated brochure includes all types of sun glasses, dust goggles, plastic work goggles, face shields, welding helmets, and dust respirators.

Non-Chafe Safety Shoes M-211

Hy-Test Div., International Shoe Co. This 1-page bulletin describes the unique construction which assures safety-shoe wearers that the shoe will not chafe the ankles. In place of the usual top-facings the Hy-Test shoes offer the added comfort of a narrowly folded edge that prevents rubbing and chafing of the skin.

MATERIALS HANDLING

Roller Conveyors M-212

E. W. Buschman Co. A comprehensive new catalog has 16 pages showing a wide variety of roller conveyors together with selection data and diagrams. Seven styles of ball bearing rollers are described as well as mounting specifications, curves, multiple rows, spurs, converging and hinged sections, supports, stands and guard rail. Photos of typical installations are included.

Automatic Tongs M-213

Heppenstall Co. This 4-page folder shows how one metal working company cut warehousing costs by using automatic tongs in an integrated materials handling system. Supplemented with 6 photographs, the text describes the specially designed tongs and racks which are remotely controlled by a craneman on the warehouse floor. The safety tongs are used for handling bars and pipes, coils of wire, and chains.

4 Ways to Simplify Handling M-214

Cambridge Wire Cloth Co. A new folder shows, in flow-sheet form, the movement of stock through a typical steel warehouse, showing how and where woven wire slings can be used to best advantage to simplify the handling of tubing and bar stock. It covers the four problems of unloading, processing, stocking and shipping.

FLOOR MAINTENANCE

Conductive Coating for Floors M-215

Walter G. Legge Co., Inc. This 1-page bulletin shows how to prevent fire losses where static electricity might ignite flammable gases, vapors or dusts. Conducote, a floor coating, is recommended for these hazardous areas in hospitals, warehouses, factories, textile mills, fuel depots, ammunition plants, etc.

Masterquick Method of Floor Repair M-216

The Master Builders Co. How to patch or resurface old and pitted concrete floors with the least interference with production is described in this illustrated 8-page brochure. The bulletin features the advantages of the iron aggregate over ordinary asphalt emulsion materials and shows in step-by-step pictures and drawings how to apply the Masterquick resurfacer.

PLANT MAINTENANCE

Snow Melting Systems M-217

A. M. Byers Co. A study of 50 snow melting systems operating in 15 divisions of business and industry are presented in this 36-page bulletin. The bulletin contains 83 illustrations, mostly showing the systems either operating or being installed, plus pipe layouts for a variety of installations including loading areas, ramps, sidewalks, driveways and highways.

Pipeline Filter M-218

American Air Filter Co., Inc. A 2-page folder offers a detailed explanation of the functionings and proper use of this pipeline filter as well as dimension drawings and other pertinent data. Pipeline filters are used extensively where air is employed for such processes as: making ice and agitating chemicals, fermentation vats, yeast vats, and blending tanks in distilleries or wherever the gas must be free of dust and moisture. Folder also fully describes installation, maintenance and safety factors.

Stop Rust! M-219

Rust-Oleum Corp. This 16-page catalog is a guide to rust-preventive materials for structural, machinery and floor uses. These coatings include types suitable for outside use, inside use, tool finishes, heat resistance, chemical resistance, sealing, etc. Easy-to-use tables show where and how to use each type and color samples are included.

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75 Fulton Street
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December, 1951

When Is a Whole Ship Not a Hole Ship?

ADVENT of ultrasonic testing equipment for non-destructive determination of thickness is a godsend to the marine field. Expertly handled by experienced engineers this modern piece of testing equipment is saving many a hull and bulkhead from being riddled with holes.

Accepted by official agencies as a method for determining thicknesses, this non-destructive test method minimizes, and in most cases eliminates mutilation of the ship structure by drilling and patching of holes.

Thinning by corrosion has always been a bug-a-boo for ship owners. At times it has been necessary to drill up to five hundred holes in a vessel when its age indicated a thorough examination was needed. Non-destructive testing to eliminate this hole drilling has been pioneered by Sam Tour & Co., Inc. for a number of years. The result is that the findings of their representatives on several recent projects were satisfactory to the extent that the official marine surveyors did not even require check holes.

This modern method of checking the thickness of hulls and bulkheads actually prevents a whole ship from becoming a ship full of holes.

Fire Safety Urged

SEVENTY-FIVE per cent of the buildings in America are "built to burn," Jay W. Stevens, of the National Board of Fire Underwriters told the New York Rotary Club recently. Mr. Stevens, assistant manager of the San Francisco office of the National Board, pointed out that the United States has the worst fire record in the world. Tokyo, a city of five and a half million people, last year had 2,000 fires, he said. San Francisco, with a population of 800,000 had 11,000, or more than five times as many fires.

He attributed this fact to the lack of "moral courage" in meeting all the problems of fire prevention and to our lack of investigation "before the fire starts."

Commenting on the lack of "moral fiber in our official American life," Mr. Stevens said "we have become a nation of 'fixers'!" In cities which have honest governments and where regulations of all kinds are strictly and fairly enforced, Mr. Stevens said, there are "fewer fires, fewer traffic fatalities and less crime." He reviewed cases where city fire departments were corrupt and the inspectors were powerless to correct fire hazards.

Urging that all buildings be checked for fire hazards, he stated that most of the 119 lives lost in the Winecoff Hotel fire in Atlanta, Ga. several years ago could have been saved by one approved fire door to prevent the spread of fire and by the installation of fire escapes.

Mr. Stevens asked the New York Rotary Club to influence every other Rotary Club in America and all communities to the danger of fire.

To indicate how fire prevention activities can reduce fires, he referred to the time last year in New York City when Fire Commissioner Frank J. Quayle urged people to be careful with fire because the city streets were blocked with snow and the fire engines could not get through. This plea resulted in cutting the number of fires by one half.

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● CESCO Super-Safety lenses are guaranteed to equal or exceed federal specifications for optical qualities and resistance to impact. In the laboratory, CESCO cup-type safety goggles withstand severe impact tests. On the job, hundreds of thousands of CESCO goggles have proved their strength and quality in use. You find them in plants where safety standards are the highest. Add comfort and durability as additional features of CESCO goggles and you conclude: **For Safety, use CESCO.** Available with clear or filter lenses. Write for catalog showing CESCO's full line of safety goggles.

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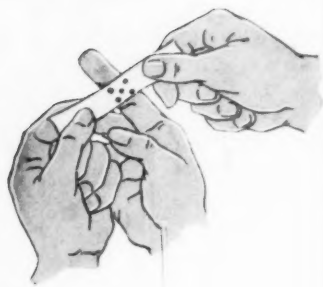

Do not neglect wounds, however small; even scratches and small cuts may become infected if they are not promptly and properly treated.

'Mercurochrome' (H.W. & D. brand of merbromin, dibromoxymercurifluorescein-sodium) is one of the best antiseptics for first aid use. It is accepted by the Council on Pharmacy and Chemistry of the American Medical Association for this purpose.

The 2% aqueous solution is not irritating or toxic in wounds; minor injuries are reported more promptly when 'Mercurochrome' is the routine antiseptic, because treatment is not painful.

'Mercurochrome' solution keeps indefinitely; the color shows where it has been applied.

Physicians have used 'Mercurochrome' for more than 28 years.

Be sure to include 'Mercurochrome' in your first aid supplies.

*Reg. U. S. Pat. Off.

HYNSON, WESTCOTT & DUNNING, INC.

H&D BALTIMORE, MARYLAND

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